# Verb-focused language intervention for late talkers: a single-subject experimental design.

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# Abstract

**Purpose:** The aim of this study was to examine whether a verb-focused language intervention was effective in increasing children's verb-vocabulary. In particular, this study investigated whether the treatment resulted in changes to children's production of target words compared to control words for children who are late talkers.

**Method:** The study utilised a single-subject, multiple baseline across behaviours design. Four children, aged 26-to-39 months who exhibited delayed expressive language development participated in the study. At the beginning of the study, all children had poor expressive language performance indicated by a mean length of utterance two standard deviations below the mean expected for their age and limited vocabulary measured by the New Zealand Communicative Development Inventory: Words and Sentences. New verb-vocabulary items were randomly assigned to intervention and untreated control conditions and probed at regular intervals over a period of eight weeks.

**Results:** All the participants showed increased use of the target verbs compared to the control verbs during the intervention and post-intervention phase.

**Conclusion:** The findings suggest that a verb-focused language intervention was effective in increasing the verb-vocabulary of late talkers. Further research is warranted to determine whether similar results can be found with a larger cohort and whether these gains are sustained over time.

# Verb-focused language intervention for late talkers: a single-subject experimental design

For most children first words emerge at approximately 12 months of age, followed by 2-word sentences around 18 months of age, once the child has 50 words or more in their expressive vocabulary. For a small number of children however, expressive language takes longer to develop and may be an indicator of later ongoing difficulties with language and school achievement (Fenson et al., 2007; Paul, 1991; Reilly et al., 2009).

Late-talking affects approximately 15-20% of toddlers who do not achieve the milestone of a 50-word vocabulary or word combinations by 24 months of age (Paul, 1991; Reilly et al., 2009; Rescorla, Mirak, & Singh, 2000). A variety of labels exist for children with expressive vocabulary delays, such as 'late language emergence'(Zubrick, Taylor, & Rice, 2007), 'late talkers' (Paul, Looney, & Dahm, 1991), 'expressive language delay' (Moore, 2010), and, later in development, 'specific language impairment' (Fey, Long, & Finestack, 2003). As variations occur in the literature regarding the criteria for these labels, the term 'late talker' (LT) will be used in this study to describe young children who have delayed onset of expressive language. It is generally accepted that LTs display a communication profile consisting of a significant expressive language delay for their chronological age, with no corresponding delay in receptive language, sensory, motor, and nonverbal cognitive measures (Rescorla, Mirak, et al., 2000; Robertson & Weismer, 1999; Weismer, Murray-Branch, & Miller, 1994; Weismer, Murray-Branch, & Miller, 1993; Whitehurst et al., 1991).

**Late Talking Implications**

While it is possible to identify children who are delayed in expressive language development by 24 months of age, less is known about their prognosis. There is little empirical evidence to inform clinicians about whether these early delays will continue into the preschool and school-

age periods or resolve on their own (Paul, 1991; Reilly et al., 2009). Consequently, uncertainty regarding clinical management for this group of children frequently occurs due to a lack of clear indicators for spontaneous recovery, uncertainty regarding appropriate diagnosis, and concern for the ongoing effects of a language delay (Paul, 1991; Robertson & Weismer, 1999; Whitehurst et al., 1991).

A "wait and see" approach is often utilised by clinicians, as improvements do occur for some children. However, a small number of LTs may have a predisposition for weak language abilities and are likely to continue having long-term difficulties with language, socialisation, and school achievement (Cable & Domsch, 2011; Desmarais, Sylvestre, Meyer, Bairati, & Rouleau, 2008; Paul, 1991; Rescorla, 2009). Research has indicated that 24 - 36 month old children who were diagnosed as having an expressive language delay at 2 years of age may have later undiagnosed pragmatic or syntactic difficulties (Whitehurst et al., 1991). It is also possible that other related difficulties will emerge later in the these children, such as reading difficulties (Whitehurst et al., 1991). In a study by Paul et al. (1991) nearly half of the children who had delayed expressive language at 2 years continued to be delayed in comparison to their peers at 3 years of age. These results are further supported by Rescorla, Dahlsgaard, and Roberts (2000) who suggested that children who were very delayed in vocabulary at 2; 6 were most likely to continue to exhibit significant expressive language delays at 3 years. A later study by Paul and Murray (1997) however, found that children with a history of expressive language delay performed within the normal range on standardized measures of language and school achievement once they were in the second grade. A small proportion of these late talkers evidenced difficulties with syntactic production in spontaneous speech in the second grade. Longer-term follow-up was recommended to confirm whether these findings continued into the intermediate and later grades (Paul & Murray, 1997). Rice, Taylor and Zubrick's (2008) study also had similar results to Paul and Murray (1997), finding that the late language emergence group was within the typical range

on a measure of general language ability at 7 years of age. However, a greater percentage of the late language emergers performed below expectations in the areas of syntax and morphosyntax when compared to their typically developing peers. Long-term follow-up of late talkers has been undertaken by Rescorla (2009), which is the only study to report late adolescent outcomes for LTs. Rescorla's (2009) results indicated that children with slow expressive language development at 24-31 months of age generally scored in the average range at 17 years and did not have significant language impairment. However, they continued to have weaker language skills at age 17 when compared to their peers with typical language histories. The LTs also obtained significantly lower scores than comparison peers in the areas of vocabulary, grammar and verbal memory (Rescorla, 2009). This indicates that while late talkers show some improvement over time, a number of late talking toddlers appear to be at risk for continued delay and are therefore appropriate candidates for early intervention (Cable & Domsch, 2011; Desmarais et al., 2008; Paul et al., 1991; Reilly et al., 2010; Rescorla, 2009; Rescorla, Mirak, et al., 2000). Early intervention has the potential to increase the likelihood of improving outcomes in the later years (Paul, 1991; Robertson & Weismer, 1999). Therefore, intervention aimed at vocabulary building to increase language production may be warranted for LTs (Rescorla, Mirak, et al., 2000; Weismer et al., 1994). The difficulty for clinicians is determining which young children should be left to outgrow the problem and which should be provided with intervention (Paul, 1991; Paul et al., 1991; Rescorla, Dahlsgaard, et al., 2000; van Kleeck, Gillam, & B., 1997; Whitehurst et al., 1991). Considering the evidence of long-term risk for continued weak language abilities among some LTs, investigation into effective intervention is warranted (Cable & Domsch, 2011; Reilly et al., 2010; Rescorla, 2009).

**Focused Language Stimulation Intervention**

Ultimately, the objective of early intervention is to teach words in order to stimulate the child's language learning system (Girolametto, Pearce, & Weitzman, 1996). Planning therapy for a child

with a language delay often involves some challenges however, including determining the targets for the programme, who should be the primary intervention agent, how the intervention should be delivered, and what procedures should be used (Fey, Cleave, Long, & Hughes, 1993). Although there is extensive evidence regarding the effectiveness of a variety of therapy approaches in older preschoolers, a recent review of the research available on the effects of intervention for children with late language emergence found only 11 studies (Cable & Domsch, 2011). Therefore, research regarding the effectiveness of early intervention for late-talking toddlers is limited (Cable & Domsch, 2011; Robertson & Weismer, 1999).

A recent review of the literature by Cable and Domsch (2011) indicated that communication improvements can be seen in LTs following the use of focused stimulation by parents or caregivers. Focused stimulation involves adult modelling of the language target through frequent highly concentrated presentations of the target, using the strategies of repetition of short statements, providing comments, and asking questions containing the target words. Activities are arranged and techniques are used to encourage the child's attempts of the targets. The child is not required to imitate or produce the target, only listen while the target is modelled by an adult. (Desmarais et al., 2008; Fey et al., 1993). The results of Girolametto et al.'s (1996) study suggested that production practice may not be necessary to reinforce the child's acquisition of target words. Girolametto et al. (1996) also found that focused stimulation benefitted LTs. They taught caregivers to provide frequent examples of target words in isolation and in two word combinations (e.g., agent + action) over an 11 week period. They observed that children in the experimental group showed significant improvements, with large effect sizes compared with a control group in both vocabulary and syntax, as measured by parental report using the MacArthur Communicative Development Inventory (Cable & Domsch, 2011; Fenson et al., 1993).

The technique of providing frequent models is also supported by Riches, Tomasello, and Conti-Ramsden (2005). Both the children with SLI in Riches et al.'s (2005) study and the younger expressively delayed children observed by Girolametto et al. (1996) and Fey et al. (2003) benefitted from multiple closely spaced examples, thereby indicating that frequency may be an important factor for children with language delays and may facilitate learning (Riches et al., 2005). An advantage of focused stimulation techniques is also that they can be used in everyday contexts, thereby increasing the likelihood that the newly acquired language targets will be generalised and used spontaneously (Cable & Domsch, 2011; Fey et al., 1993; Girolametto et al., 1996).

In a focused stimulation approach the target words to be modelled are chosen if they are absent from the child's expressive vocabulary, able to be understood by the child, capable of being represented by real objects, and if they contain sounds already present in the child's phonetic inventory. Many of the studies employing this intervention approach have selected object labels (nouns) as target words (Girolametto et al., 1996; Whitehurst et al., 1991) with one study incorporating both object and action labels (Weismer et al., 1993). The outcome measurement of interest in studies examining focused language stimulation has been the number of target and control words learned (Cable & Domsch, 2011). Success can also be shown through substantial increases in expressive language skills during and immediately following intervention, compared to a control group (Whitehurst et al., 1991).

While many studies have indicated the positive effects of focused language stimulation for promoting language development, the review by Cable and Domsch (2011) indicated that only a small number of these studies have examined the effects of intervention for 2 and 3 year old children; few have demonstrated generalisation and long-term benefits; and only a limited number have included untreated control groups. Further evidence is therefore needed to support use of this intervention for different profiles of children with language impairment and further

studies with individual outcome data and consistent measurement would be beneficial (Cable & Domsch, 2011; Girolametto et al., 1996; Whitehurst et al., 1991).

Furthermore, the majority of studies on language-impaired children have focused on nouns with limited attention given to verb acquisition (Conti-Ramsden & Jones, 1997; Naigles, Hoff, & Vear, 2009; Rescorla, Mirak, et al., 2000; Watkins, Rice, & Moltz, 1993). A recent study by Moore (2010) indicated promising results for expressive language following a hybrid focused language stimulation approach using verbs. This approach included focused stimulation of the target verbs during play, as well as incorporating structured teaching of target words and using the target words during story-book reading. Moore (2010) reported that all the late-talking participants (N=4) demonstrated an increase in target verbs and the majority showed significant increases in mean length of utterance (MLU). While improvements were observed, it is unclear whether the gains were due to the intervention or natural maturation, as there was no untreated control condition. As suggested by Moore (2010), it would be of interest to determine whether this verb-focused language stimulation approach would again be successful if replicated in a study utilising a randomised control design or other form of experimental measure to determine a clear cause-effect relationship.

**The Role of Verbs in Language Development**

The consideration of verbs is important, as verbs play a fundamental role in language development. Verbs may encourage early grammatical development, as verb properties influence and direct many other aspects of grammar (Conti-Ramsden & Jones, 1997; Naigles et al., 2009; Watkins et al., 1993). Some studies have suggested that children with language impairment show significant difficulty with the acquisition of verbs, which affects their general morphological development (Conti-Ramsden & Jones, 1997; Hadley, 1998). Therefore, children having a smaller verb lexicon could be one of the variables limiting children's development of

sentence production (Andreu, Sanz-Torrent, Legaz, & MacWhinney, 2012; Conti-Ramsden & Jones, 1997; Hadley, 1998; Watkins et al., 1993).

When considering young children's early words, research by Caselli et al. (1995) suggests that nouns dominate and comprise the majority of the first 50-100 words acquired by English speakers. Verbs differ from nouns and are more semantically and syntactically complex than nouns (Caselli et al., 1995). Nouns may be easier to acquire because they refer to concrete object-reference concepts (such as people and objects) whereas verbs refer to relational concepts, actions, or processes that can differ across time and space (Andreu et al., 2012; Conti-Ramsden & Jones, 1997). When children intentionally communicate with others, it is almost always to relay information concerning events, actions or states of affairs. Consequently, when young children are using object labels as single word utterances, it is almost always to explain an event or action. For example, when a toddler says "juice" they are often requesting their mother 'get' them some juice or letting her know they are 'thirsty'. If they were using sentences, they might say, "Get me some juice!" or "I'm thirsty!" The action and underlying verb is therefore implicit in the singular label. When verbs are used they also always contain an implied participant, which makes them more semantically complex than nouns. For example, if there is 'running', there is a 'runner' involved. The acquisition of verbs is therefore an important step in achieving grammatical capability, as the use of verbs facilitates a verb-argument structure (such as 'event-participant') that provides a foundation for building a mature sentence structure (Tomasello & Brandt, 2009).

**The Relationship between Verbs and Language Impairment**

Conti-Ramsden and Jones (1997) have suggested that children with language impairment are delayed in their verb lexicon development, which may in turn be affecting their morphological development. In their longitudinal study, they found that children with SLI had smaller verb

lexicons, less diverse lexicons, and were more input-dependent compared to MLU matched control children. These findings also occurred within the context of greater use of nouns by the children with SLI than the normal-language children. A study by Hadley (1998) of young children aged 19 – 38 months also found that delayed development of verbs was evident for many children with SLI before the preschool years. During the longitudinal period of investigation many children with SLI caught up with acquiring nouns and simultaneously fell further behind in verb-phrase elaboration.

A possible reason for language impaired children's delayed verb development may be because nouns are processed more quickly than verbs. Andreu et al. (2012) used a picture-naming task to compare the response times and naming accuracy of nouns and verbs in Spanish-speaking language-impaired children. The results showed that verbs required more time to process than nouns. With regard to accuracy, all the groups were better at naming nouns than verbs (Andreu et al., 2012). Verbs may also be difficult to recall and require more frequent models in order to be retained. The findings from Riches et al.'s (2005) study indicated that children with SLI show poor retention of recently acquired verbs. Verbs represent events that often occur for limited time periods, thereby enabling actions to be observed only for a brief period. Consequently, verbs may carry a greater cognitive load for children with SLI, as learning verbs requires more than direct observation, but also more extensive use of processes such as memory and reasoning (Conti-Ramsden & Jones, 1997).

Conti-Ramsden and Jones (1997) suggested that low verb use may be due to 'input dependency'. Children with SLI have difficulty learning verbs and therefore use fewer verbs in their spontaneous speech. This in turn affects the frequency with which parents recast new verb-phrase information for their children, which therefore provides few examples or opportunities for children to use verbs in conversation (Conti-Ramsden & Jones, 1997).

The difficulty for clinicians is determining which young children with delayed verb development are at risk for later language difficulties and when it is appropriate to intervene. Hadley (2006) suggested that children are at risk for communication deficits if they are not using any verbs by 24 months, or if they use fewer than 20 verbs by 27 months. When children add verbs to their vocabulary, they also tend to start forming sentences. The limited use of verbs and subject-verb sentences by 30 months thereby indicates a risk for language impairment (Hadley, 2006).

While these studies suggest that children with language impairments may have particular difficulties with verbs, their results should be interpreted with caution, as many of the investigations consisted of small samples, older children, and included participants who had accompanying receptive language difficulties. Therefore, further investigation into the role of verb acquisition on language development among young expressively delayed children is warranted (Conti-Ramsden & Jones, 1997; Naigles et al., 2009).

**Summary**

Speech Language Therapists are keen to provide early intervention to young children with language delays in order to prevent ongoing language-learning and associated difficulties. Late-talking toddlers appear to be at risk for continued language difficulties, making them suitable candidates for intervening early. Vocabulary building using a focused stimulation approach has been shown to be effective in increasing language production among LTs (Cable & Domsch, 2011; Desmarais et al., 2008; Girolametto et al., 1996; Paul et al., 1991; Reilly et al., 2009; Rescorla, Mirak, et al., 2000; Weismer et al., 1994).

When considering language development, verbs play an important role as they encourage early grammatical development. Furthermore, children with language impairment have been shown to experience significant difficulty with the acquisition of verbs (Andreu et al., 2012; Conti-Ramsden & Jones, 1997; Hadley, 1998; Naigles et al., 2009; Watkins et al., 1993). Given that

verbs play an important role in sentence production and late talkers show delay in expressive vocabulary and verb production, it seems reasonable to target verbs in order to facilitate language production, once children have an established lexicon of approximately 50 words (Caselli et al., 1995). As there are only a small number of intervention studies with LTs, further individual outcome data and consistent measurement is required to support intervention among different profiles of children with language impairment (Cable & Domsch, 2011; Girolametto et al., 1996; Whitehurst et al., 1991).

The study by Moore (2010) indicated promising results for LTs expressive language following a hybrid focused language stimulation approach while targeting verbs. Considering the relative success of a focused stimulation approach with LTs and the importance of verb acquisition for language development, it would be of interest to determine whether Moore's (2010) verb-focused language stimulation approach would again be successful if replicated with different participants and therapist in a study utilising an experimental design employing untreated control verbs.

**Research Question**

The current study aimed to address the research question: What are the effects of a verb-focused language intervention on the expressive vocabulary in children who are late talkers? In particular, does treatment result in any change in production of target words for children who are late talkers? It was hypothesised that the intervention approach would result in the participants increasing their use of the target words in comparison to the non-treated control words.

# Method

A recent study by Moore (2010) indicated promising results for expressive language following verb-focused therapy. The current study was based on a modification of the methods by Moore (2010) to determine whether similar results could be achieved.

This study was approved by the University of Canterbury Human Ethics Committee (HEC 2012/139). A copy of the approval for this study is provided in Appendix A.

## Design

This study utilised a single-subject multiple baseline across behaviours design with four participants.

The single-subject design enabled a comparison of performance between experimental and control conditions in individual participants (Thompson, 2006). A single-subject multiple baseline across behaviours design was chosen, as it enabled an untreated control element to be included without withdrawing treatment (McReynolds & Thompson, 1986). As replications are a requirement of multiple baseline designs, this study involved four participants to ensure replication of the treatment effect was observed in more than one child and across four targeted verb sets for each child (McReynolds & Kearns, 1983).

This study utilised periodic probe tasks in order to measure change in vocabulary scores of the probe task. The percent correct of participants' expressive responses to these probe tasks served as the dependent variable throughout the study (Thompson, 2006).

Using the multiple baseline across behaviours approach, baseline data were collected for four sets of verbs (5 target verbs per set) in each study participant. The sets were randomly assigned

to each participant, in order to control for order effects (Thompson, 2006). Three verb sets were treated and one set remained untreated (control) throughout the study. The intervention was applied to one behaviour (verb set) at a time for five sessions each. Experimental control was demonstrated when changes in the dependent variable (verb probes) occurred only when the B phase (intervention) was in effect for each behaviour. Verb set 4 remained untreated (at baseline) throughout the study to serve as a further control element, as it was anticipated that baseline performance of untreated behaviours would remain stable unless treated (Thompson, 2006).

The study consisted of an initial assessment followed by three experimental phases: baseline testing (to determine performance and stability prior to intervention), an intervention phase (to determine performance during intervention), and a post-intervention (re-assessment) phase to determine maintenance of the targeted behaviours.

## Participants

**Overview.** Four participants were recruited and participated in this study. The participants were all male preschoolers who ranged in age from 26 months to 39 months at the time of the initial assessment. The participants all presented with delayed expressive language and receptive language scores within normal limits (see Table 1).

**Recruitment.** Participants were recruited from the Ministry of Education speech language assessment waitlist, with permission from the Ministry of Education. Referrals on the waitlist were screened. Any referrals that met the criteria for participation in the study were invited to take part. Parental consent was obtained from all participants' parents before taking part in the study. A copy of the information form and consent form are provided in Appendix B and C.

**Inclusion criteria.** Inclusion criteria for this study required participants to present with an expressive language delay, receptive language within normal limits, and be at least 24 months of age. Diagnosis of an expressive language delay followed Moore's (2010) criteria, which required the participants to present with: (a) MLU of at least two standard deviations below the mean expected for their age (Miller & Chapman, 1981), (b) a limited vocabulary, as measured by an adaptation of the MacArthur-Bates Communicative Development Inventories (CDI): Words and Sentences (Fenson et al., 1993) to New Zealand English (Reese & Read, 2000) and (c) receptive language scores within normal limits, as measured by the Preschool Language Scales Fifth Edition: Australian and New Zealand Language Adapted Edition (PLS-5) (Zimmerman, Steiner, & Pond, 2012).

**Exclusion criteria.** Children referred to the study were excluded if they: (a) had a diagnosis or history of a neurological, sensory or cognitive disorder (b) failed to pass a hearing screening within six months of the study, or (c) did not have English as the only language spoken at home (Moore, 2010).

## Procedures

Assessments and intervention were performed by the researcher, a qualified Speech Language Therapist. Assessment and intervention for the study took place in a quiet clinic room or the participants' home, determined by mutual agreement between the participants' family and therapist. All assessments and intervention sessions were digitally recorded using a Sony Handycam HDR-CX110E.

**Initial assessment.** Following recruitment, an initial assessment was conducted to provide measures of the participants' language status and determine eligibility for the study. This included a case history, as well as measures of receptive and expressive language.

***Case history.*** Case histories were obtained from each child's parents. This provided background information, as well as further assisted in determining whether any participants presented with any of the exclusionary criteria, such as a history of developmental delays or syndromes. A copy of the case history form is provided in Appendix D.

***Expressive Language.*** *Language sample.* The participants' expressive language was measured by obtaining a 20-minute language sample from the participants while they engaged in free play with their parent, in accordance with Miller and Chapman's (1981) procedures. The language samples were transcribed and analysed using the Systematic Analysis of Language Transcripts (SALT) software, New Zealand version protocol (Gillon & Westerveld, 2012). The SALT software was used to calculate the MLU in morphemes for each child, to enable comparison with the mean expected for each participant's age and determine whether the child's MLU met the criteria of two standard deviations below the mean expected for their age (Miller & Chapman, 1981). A list of the toys provided for the participant and parent to play with during the language sample are provided in Appendix E.

*CDI.* The expressive language checklist measure, the CDI Words and Sentences, was used to obtain information about the participants' vocabulary size, verb use, and sentence complexity. The CDI requires parents to provide information on the words and sentences used by their child. Information from this assessment was used to determine whether the participants presented with a restricted vocabulary and also to establish the number of verbs present in the participants' expressive vocabulary (Dale & Fenson, 1996; Moore, 2010). Parent completion of the Action Words subscale of the CDI assisted in determining the verbs to be targeted during the intervention phase of the study.

*PLS-5.* Formal measures of the participants' expressive language were also made in the initial assessment by administering the Expressive Language subtest of the PLS-5 (Zimmerman et al., 2012). This provided complementary information.

***Receptive language.*** *PLS-5.*The participants' receptive language was measured using the PLS-5 (Zimmerman et al., 2012) to determine whether their comprehension of language was within normal limits for their age. The Auditory Comprehension subtest was used. This subtest required the participants to point to the appropriate picture or follow a direction in accordance with the verbal instructions provided by the examiner. Raw scores were then converted to standard scores, which enabled comparison between the participants and typically-developing age-matched peers. This subtest was administered and scored in accordance with the examiners manual by the primary investigator.

*Comprehension of verbs.* Following parent completion of the Action Words subscale of the CDI, the comprehension of the action words not reported by the parent to be used by the child was assessed. A set of 4 pictures per page was shown to the participant and they were requested to identify, by pointing, to the action named by the examiner. For example, "Point to jump".

***Phonology screen.*** An informal speech sound checklist was completed, based on the language sample and observations in order to determine an inventory of the phonemes present in the participants' phonetic repertoire.

***Hearing screen.*** Arrangements were made for the participants' hearing to be tested at the University of Canterbury Speech and Hearing Clinic under the supervision of a qualified Audiologist within 6 months of the study. This involved behavioural screening using visual

reinforcement audiometry to determine hearing thresholds across the speech frequency range (500, 1000, 2000 and 4000 Hz at 10 and 20dB HL), tympanometry testing, as well as objective measures of cochlear function via distortion-product otoacoustic emissions.

**Baseline assessment.** A set of potential target verbs for intervention was selected to undergo probe testing, following parent completion of the Action Words subscale of the CDI.

***Probes.*** A probe task was used to evaluate production of the potential target verbs. Participants were shown pictures that represented the target words and asked to name what was happening in each picture. No corrective feedback or models of the target words were provided. Non-specific feedback was provided however, such as "great pointing", in order to maintain participation in the activity. Data regarding the use of the potential target verbs was collected over three sessions in order to establish baseline data (Moore, 2010).

***Target word criteria.*** Criteria for selection of target words included: (a) the target verbs were comprehended but not produced by the participants, as identified in the CDI, language sample and comprehension probe (Girolametto et al., 1996; Weismer et al., 1993); (b) all target verbs were produced by 50% of typically developing children by 30 months, or the participant's age (Dale & Fenson, 1996); (c) all target verbs started with a phoneme in the child's phonetic repertoire, as determined by the speech sound checklist (Girolametto et al., 1996); and (d) all target verbs could be represented by pictures, toys or gestures (Girolametto et al., 1996).

Once a pool of 20 target words was determined for each child, the target words were then randomly assigned to words sets for treatment and control conditions (Weismer et al., 1993). Families were kept blind to the control words (Girolametto et al., 1996).

A list of the target and control words for each participant is provided in Appendix F.

**Intervention phase.** The intervention phase was based on Moore's (2010) study, which utilised a hybrid approach based on a focused language stimulation model (Lederer, 2002) and incorporated grammar facilitation principles according to Fey et al. (2003). The intervention procedures are outlined in Appendix G.

The participants attended 45 minute intervention sessions twice-weekly for a total of 15 sessions (5 sessions per verb set). Each session included 5 minutes for the probe task, 5 minutes of structured teaching of target vocabulary, followed by 10 minutes of storybook reading, and then 25 minutes of focused language stimulation during play (Moore, 2010). Each therapy session was recorded and the participants' responses on the probe tasks were noted.

There were four verb sets in total, with each verb set containing five target words. Three verb sets were treated (ie., received intervention). One verb set remained untreated throughout the study (control verb set). The target words were randomly assigned across the four verb sets. The sessions were conducted by the researcher. Caregivers were able to participate in all the sessions, if they chose to.

***Probe task.*** At the beginning of each session, a probe task was completed. Pictures of the target words and control words were presented randomly, as part of a fun activity. The participant was asked to describe each picture they saw; for example, "Tell me what you see". Non-specific feedback was provided.

Productions were marked as correct if 2 out of 3 sounds were produced in the correct sequence, for example, 'hu_' for 'hug'. Phonological processes typical of the participant's age were taken into account (Weismer et al., 1993).

***Structured teaching.*** Following the probe task, structured teaching of the target words took place for five minutes. Pictures of target words (the same picture cards used in the probe task) were shown to the participant. The participant was asked to describe what was happening in the picture. Reinforcing feedback containing the target word was provided. For example, "That's right, the girl is reading".

If the participant did not use the target word, repeated models were provided with emphasis on the target word e.g. "The boy is walking. He's walking to the park. The boy and mum are going for a walk".

***Structured teaching in storybook reading.*** A storybook reading activity took place for 10 minutes following the structured teaching task. Books that enabled the target words to be modelled were chosen. The participant was expected to attend to the task, and opportunities were provided for elicited production, however the child was not required to produce the target words.

The therapist modelled the target words according to many of Fey et al.'s (2003) principles and the principles of Focused Language Stimulation (Lederer, 2002). These included highlighting the target words by using repetition, intonation and stress. Sentence recasts were also used to model the target word in well-formed phases and sentences. To clarify the word's meaning, illustrations were pointed at, gestures used, and animated facial expressions employed to clarify the meaning of the target word.

Further encouragement of child engagement with the book was undertaken by using interactive books when possible (such as 'lift-the-flaps'), being face-to-face with the child, allowing the child to hold the book, making comments, and asking the child questions throughout the story to ensure an interactive experience.

The books used during the storybook reading task are listed in Appendix H.

***Focused stimulation play.*** Focused language stimulation play with the participant occurred for approximately 25 minutes following the storybook activity. Toys were chosen by the therapist that allowed for natural opportunities to use the target words. During this play, the therapist modelled the target words according to many of Fey et al.'s (2003) principles and the principles of Focused Language Stimulation (Lederer, 2002). The therapist provided frequent and highly concentrated models of the target words and manipulated the social and linguistic environment to create opportunities for participants' to use the target words. The target words were highlighted and emphasised by using repetition, intonation and stress. Sentence recasts were used to model the target word in well-formed phases and sentences. To clarify the word's meaning, the target words were illustrated through demonstration with the toys, use of gestures, and play-acting. Opportunities were provided for elicited production, however the child was not required to produce the target words.

The toys used during the focused language stimulation activity are listed in Appendix I.

**Post-intervention phase.** Following the intervention, data was gathered from language samples and probes of the target words four weeks after the intervention concluded. This was to determine whether gains made during the intervention phase were maintained with the target

words and overall expressive vocabulary, as demonstrated through MLU (Girolametto et al., 1996).

The post-intervention phase occurred during one session four weeks following the conclusion of intervention. The post-intervention phase consisted of: (a) probes of the target and control words (b) a 20-minute language sample of the participants engaged in free play with their parent (c) parent completion of the CDI.

The probe task was administered in the same manner as baseline assessment and intervention. The language samples were collected, transcribed, and analysed in the same manner as in the initial assessment. The same set of toys were provided to the child and parent for play during the language sample in the initial and re-assessment.

**Data Analysis**

**Outcome measures.** Results from the probe tasks were recorded by the therapist and the language samples from the initial and re-assessment were recorded and transcribed by the therapist. Transcriptions included all vocalisations and word attempts made by the participants, regardless of speech accuracy. Transcriptions were made according to SALT conventions and analysed using SALT software, in accordance with SALT protocols (Gillon & Westerveld, 2012). Parents of the participants completed the CDI. This was completed at the initial assessment as well as periodically during intervention and again at re-assessment.

This data provided information on the number of target and control words used, the MLU for each participant, as well as the number of different words, total words, and action words used by each participant.

The use of visual analysis in the form of graphs and tables was used to illustrate the replication of the dependent measure within and between phases for all participants, enabling trends to be observed (McReynolds & Kearns, 1983; Portney & Watkins, 2009).

**Fidelity of Treatment**

All sessions were recorded in order to establish procedural validity. In order to document the quality of the treatment implementation (i.e., treatment fidelity), two independent observers, who were final year Bachelor of Speech Language Pathology (BSLP) students, received training in the intervention procedures and analysed a random selection of 10% of intervention sessions. The sessions were reviewed and the intervention activities of structured teaching, storybook reading, and focused stimulation play were scored to determine whether the therapist consistently implemented the intervention techniques in the manner specified for all participants across sessions. An inter-rater agreement of 100 percent was calculated. The treatment fidelity checklist used by the BSLP students is included in Appendix J.

A record of session attendance was also kept for all participants. All fifteen intervention sessions were completed by all participants. Sessions were occasionally rescheduled if required.

To allow description and analysis of whether home practice activities may have affected the results, the researcher asked the parents at each session to report how frequently they engaged in home practice of the target words. This information, along with the therapist's observations of parent-child interactions, provided complementary information to the results (Yoder, Molfese, & Gardner, 2011).

## Fidelity of Probe Task

In the same manner as the treatment tasks, 10% of the sessions were reviewed and scored by the BSLP students to determine whether the probe tasks were implemented as planned. The BSLP students also recorded responses made to the dependent measures to enable inter-scorer agreement for the observed sessions (Girolametto et al., 1996; Weismer et al., 1993; Yoder et al., 2011). An inter-rater agreement of 100 percent was calculated. The treatment fidelity checklist used by the BSLP students is included in Appendix J.

## Participant Description and Initial Assessment Results

The results from the initial assessment for all participants are presented in Table 1 and are discussed individually, along with background information, for each participant.

**Table 1**

***Initial Assessment Results for All Participants***

| **Participant** | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Age in months | 39 | 32 | 26 | 35 |
| **PLS-5**[a] | | | | |
| Auditory Comprehension Subtest[b] | 108 | 98 | 118 | 109 |
| Expressive Language Subtest[b] | 74 | 77 | 82 | 82 |
| **Language sample** | | | | |
| MLU[c] in morphemes | 1.02 | 1.08 | 1.06 | 1.26 |
| MLU[c] z-score | -3.2 | -2.73 | -2.19 | -2.67 |
| Number of different words[d] | 52 | 30 | 27 | 56 |
| MSL[e] | 2 | 2 | 2 | 2 |
| **CDI**[f] | | | | |
| Total words | 54 | 63 | 53 | 48 |
| Total words z-score[g] | -3.54 | -3.47 | -1.66 | -3.59 |
| Action words subtest[h] | 5 | 2 | 1 | 0 |
| Complexity[i] | 0 | 0 | 0 | 0 |
| Combining words | Not yet | Sometimes | Sometimes | Sometimes |
| **Verbs** | | | | |
| Target verbs produced[j] | 0 | 0 | 0 | 0 |

*Note:* [a] PLS-5 = Preschool Language Scale Fifth Edition. [b] Standard score with mean = 100, standard deviation = 15. [c] MLU = Mean Length of Utterance in morphemes, where mean for age 39 months = 3.47 and standard deviation = 0.756; mean for age 32 months = 2.75 and standard deviation = 0.611; mean for age 26 months = 2.13 and standard deviation = 0.488; mean for age 35 months = 3.06 and standard deviation = 0.673 (Miller & Chapman, 1981). [d] Obtained from 20 minute language sample with minimum of 50 utterances (Miller & Chapman, 1981). [e] MSL =

Mean Syntactic Length, where mean of utterances containing 2 or more morphemes are calculated. [f] CDI = MacArthur-Bates Communicative Development Inventory: Words & Sentences (New Zealand English Adaptation). [g] Based on American norms as New Zealand norms not available: Mean for age 30 months = 510.2 and standard deviation = 128.7 (no norms available above 30 months of age); mean for age 26 months = 358.4 and standard deviation = 183.7 (Dale & Fenson, 1996). [h] Total action words = 103. [i] Section E of CDI. [j] Total verbs targeted during intervention = 15.

**Participant One.** ***Background information.*** Participant One (P1) was a male aged 39 months at the time of the initial assessment. He had an older 4 ½ year old brother, who was conceived at the same time with In Vitro Fertilisation. English was the only language spoken in his home. His father identified their ethnic group as New Zealand European. Both parents had obtained further qualifications following secondary school.

At the time of the assessment P1's parents reported that they had no concerns for P1's language comprehension, but that his expressive language was delayed. No other developmental concerns were reported or observed.

P1 was born five weeks early. There were no complications reported during pregnancy or delivery. P1 acquired meningitis and bronchilitis within the first three months after birth and recovered from both. There were no feeding or dribbling concerns reported or indicated.

P1's parents reported that he babbled as a baby. He then predominantly communicated by pointing at what he wanted and approximated some words. The family started introducing some signs to assist P1's communication due to his poor expressive vocabulary. There was no reported family history of speech, language or learning difficulties. P1's parents reported that he has an excellent relationship with his brother and others.

P1's father reported that he had frequent ear infections and did not pass his hearing checks when he was younger. Once he had grommets inserted, at approximately two years of age, he passed subsequent hearing checks. While participating in the study, P1 had his hearing checked at the University Canterbury Speech and Hearing Clinic by a Master of Audiology student, under the supervision of an Audiologist. The results indicated that P1 had normal hearing across the speech frequencies in both ears.

P1 had received a speech and language screening assessment through the Ministry of Education to determine eligibility for formal assessment, but had not received any speech language therapy prior to participating in this study.

P1's intervention sessions were attended by either of his parents or his grandmother, who was living with him at the time. All caregivers were active participants during the intervention sessions. P1's father reported that the target words were practised on a daily basis between either P1's mother, father or grandmother, as part of daily routines such as bed and bath time.

***P1 initial assessment results.*** The initial assessment results indicate that P1's receptive language was within normal limits for his age, as his auditory comprehension standard score on the PLS-5 was within one standard deviation of the mean.

P1's expressive language showed signs of a significant delay, based on a small vocabulary (reported in the CDI) and low MLU for his age. P1's parents reported a total of 54 words on the CDI. There are no norms available for a child aged 39 months however, to provide an indication of P1's level of delay, 50% of boys at 30 months of age typically achieve 520 words on the CDI (Fenson et al., 2007). P1's MLU in morphemes was 1.02, which fell 3.2 standard deviations (SD) below the mean expected for his age of 39 months (Miller & Chapman, 1981).

**Participant Two.** ***Background Information*****.** Participant Two (P2) was a male aged 32 months at the time of the initial assessment. He was an only child from a monolingual English family. His mother identified their ethnic group as New Zealand European. His mother reported that she had obtained a diploma after achieving secondary school qualifications.

P2's mother indicated concern for his expressive language development, but had no concerns for other areas of development and none were observed by the therapist during the assessment.

P2 was born at full-term without any complications during pregnancy or birth. There were no feeding concerns indicated, although P2's mother reported that he often dribbled. There were no reported major health difficulties.

P2's mother reported that he babbled as a baby and then started using some words. At the time of the assessment, his mother reported that he communicated by using occasional words, body language, pointing and showing people what he wanted. P2's mother reported that she has Dyslexia. There were no other reports of any family history of speech, language or learning difficulties. P2 had not received any speech language therapy prior to participating in this study.

P2 had his hearing checked at the University Canterbury Speech and Hearing Clinic while participating in the study. The hearing assessment was completed by a Master of Audiology student, under the supervision of an Audiologist. The results indicated that P2 had normal hearing across the speech frequencies in both ears.

P2's mother attended all of his intervention sessions. His father attended on two occasions and his preschool teacher attended on one occasion. P2's mother participated intermittently in the therapy sessions. She generally observed and became involved at P2's request. P2's mother reported that some of the target words were practised every day, depending on their daily activities.

***P2 initial assessment results.*** The results from P2's initial assessment are presented in Table 1. Administration of the PLS-5 auditory comprehension subtest resulted in a standard score of 98, placing P2 within one standard deviation of the mean. This indicates his receptive language was appropriate for his current age.

P2's expressive language was judged to be delayed, based on a small vocabulary of 63 words, as reported in the CDI. With no norms available for a child aged 32 months, an indication of P2's delay is illustrated by the expectation that 50% of boys at 30 months of age typically achieve 520 words on the CDI (Fenson et al., 2007). P2 also presented with a limited MLU of 1.08, which fell 2.79 SD below the mean expected for his age (Miller & Chapman, 1981).

**Participant Three.** ***Background information.*** Participant Three (P3) was a male aged 26 months at the time of the initial assessment. He was the third child in a home where English was the only language spoken. P3's mother identified his ethnic group as New Zealand European and her own as USA European. P3's mother reported that she had gained tertiary qualifications following secondary school. P3's mother indicated concern for his speech and language development and commented that, "he wants to communicate but isn't able to". P3's mother did not report concern for any other areas of development and none were observed by the therapist.

There were no complications reported during pregnancy with P3. He was born at full-term and needed to be resuscitated at birth, experiencing less than 2 minutes without oxygen. No other complications, health or feeding difficulties were reported.

P3's mother reported that he said his first words at 13 months of age but then communicated predominantly by pointing, grunting, and occasionally asking or commenting. His mother reported that he gets on very well with his siblings and others. There were no reports of a family

history of speech, language or learning difficulties. P3 did not have any speech language therapy prior to participating in this study.

P3's mother reported that he had ear infections during the winter months, but that she has no concerns for his hearing. While completing the current study, P3's hearing was checked at the University of Canterbury Speech and Hearing Clinic by a Master of Audiology student, under the supervision of an Audiologist. The results indicated that P3's middle ear and cochlear function were within normal limits. Measures of cochlear function via distortion product otoacoustic emissions indicated normal emissions bilaterally. P3 was not able to be conditioned to the task for behavioural audiometry and therefore this assessment was due to be re-administered again in six months time.

P3's mother attended all of his intervention sessions, was an active participant in all sessions, and reported that she engaged in daily practise of the target words. On a few occasions P3's older sister became involved in the focused language stimulation play activities during the sessions. P3's father participated in one session.

***P3 initial assessment results.*** The results from P3's initial assessment are presented in Table 1. P3's auditory comprehension standard score on the PLS-5 was 118, indicating his receptive language was above the level expected for his age.

P3's expressive language was judged to be delayed, based on a small vocabulary of 53 words, as reported in the CDI, which indicates he was below the 5$^{th}$ percentile for his age (Fenson et al., 2007). P3 also presented with a limited MLU of 1.06, which fell 2.19 SD below the mean expected for a child aged 26 months (Miller & Chapman, 1981).

**Participant Four.** ***Background information.*** Participant Four (P4) was a male aged 35 months at the time of the initial assessment. He was the third child in his family, with an older brother and sister. P4 came from a monolingual English home and both he and his mother's ethnic group were identified as New Zealand European. P4's mother gained secondary school qualifications and runs her own business.

P4's mother indicated concern for delays in P4's speech and expressive language development. She reported that P4 said his first words at approximately 27 months of age. He predominantly communicated by pointing, shaking or nodding his head in response to his mother, and using the sounds 'ooh' and 'aah'. All other areas of development were reported to be developing as expected. No other developmental concerns were observed by the therapist.

There were no complications reported during pregnancy or delivery with P4. P4 has experienced some health difficulties with a persistent cough since January 2011. He received antibiotics periodically until November 2011 and then underwent a bronchoscopy in the same month. P4 again received antibiotics periodically until September 2012. During intervention sessions, P4 was frequently noted to have a persistent wet and 'chesty' cough, runny nose, and he again received a course of antibiotics.

His mother reported that he gets on very well with his siblings and others. There was no reported family history of speech, language or learning difficulties. P4 did not receive any speech language therapy prior to this intervention study. He had participated in an assessment study at the University of Canterbury.

While completing the study, P4 had his hearing assessed at the University Canterbury Speech and Hearing Clinic by a Master of Audiology student, under the supervision of an Audiologist. The results indicated that P4 had normal middle ear function in both ears. Behavioural

audiometry could not be completed, as P4 was unable to condition to the task and this assessment was due to be re-administered again. P4's mother reported that she had no concerns for his hearing.

P4's mother was present for all of the sessions and she participated on occasions, generally at P4's request. She did not always observe the intervention sessions, but often was in an adjacent room where she could hear the proceedings. She reported that the target words were practised daily as part of regular routines.

***P4 initial assessment results.*** The results from P4's initial assessment are presented in Table 1. P4's auditory comprehension standard score on the PLS-5 was 109, indicating age-appropriate receptive language.

P4 presented with an expressive language delay, based on a small vocabulary of 48 words, as reported in the CDI. According to CDI norms for boys aged 30 months, 50% of them typically achieve 520 words by this age (Fenson et al., 2007). P4 also presented with a limited MLU of 1.26, which fell 2.67 standard deviations below the mean expected for a child aged 35 months (Miller & Chapman, 1981).

# Results

The results are presented for all participants and then individually. The results are displayed visually in table and graph form to show the level of performance achieved by each participant. Visual analysis has been used to display the results, as it is frequently used to analyse single subject data and focuses on the clinical significance of the results. The two standard deviation band method was not used, as in Moore's (2010) study, as this investigation did not involve a fluctuating baseline (Portney & Watkins, 2009).

The data from the probe tasks was used to determine whether treatment resulted in any change in production of the target words compared with a set of control words. The participants' MLU was also measured from a language sample pre- and post-intervention to determine whether any changes occurred.

The results from the probe tasks for all participants pre- and post-intervention are presented in Figure 1. They illustrate that all the participants produced more target words compared to control words following the intervention, indicating the effectiveness of a verb-focused language intervention. As this was replicated across each participant, this further supports the success of the treatment.

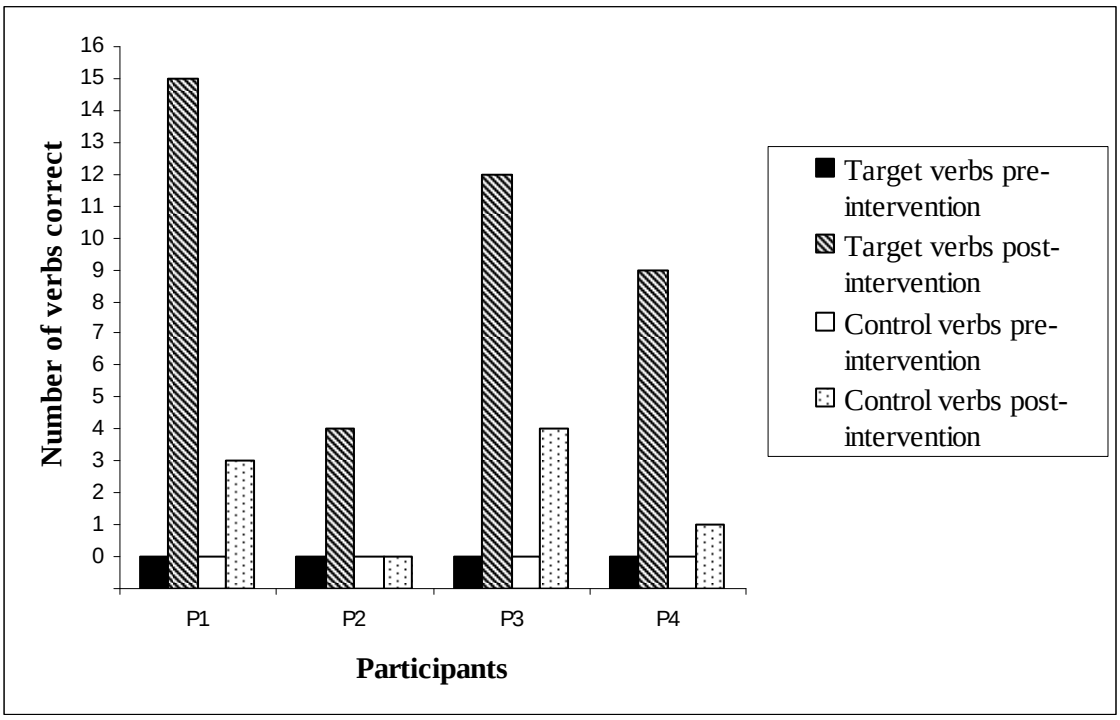


***Figure 1.*** **Target and control verbs pre- and post-intervention results for each participant.**

The results from the CDI, which was provided to the parents at the initial and re-assessment sessions, are shown in Figure 2. Visual inspection reveals that all participants demonstrated significant increases in their overall total use of words, as well as use of action words post-intervention.

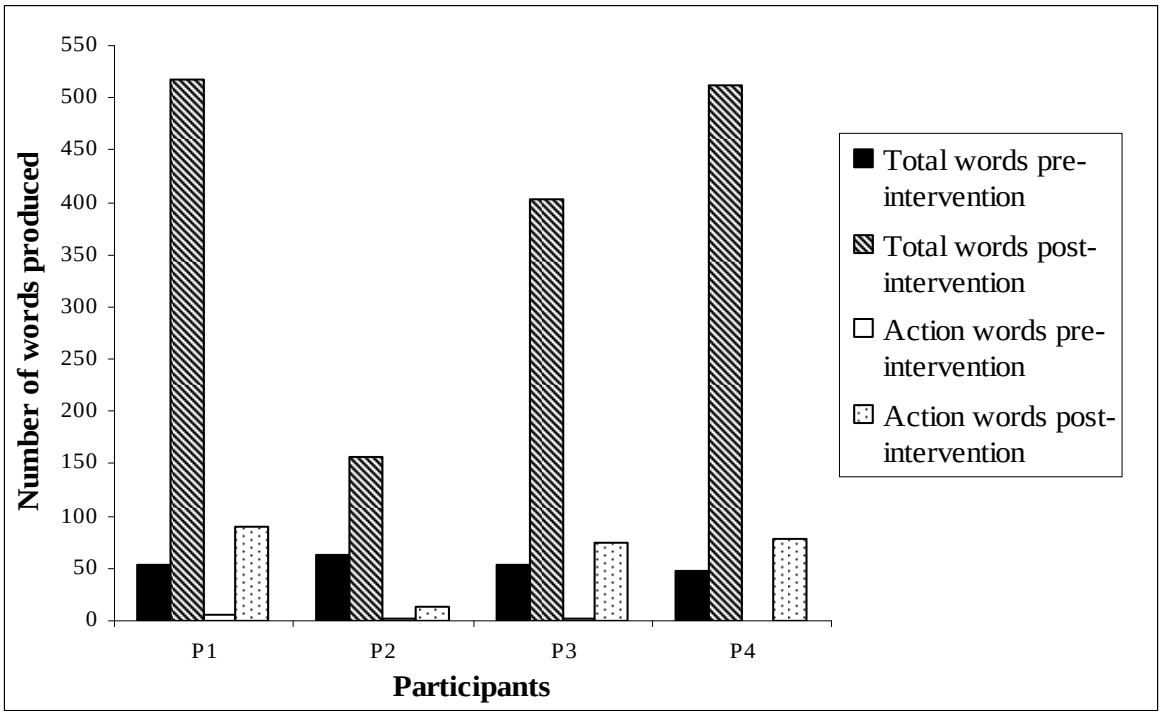


***Figure 2.*** **Total words and action words pre- and post-intervention results for each participant.**

The participants' MLU was also assessed pre- and post-intervention (a period of 4 months), with their rate of change measured in comparison to expected norms. Figure 3 illustrates that all the participants demonstrated gains in MLU during the intervention period. Visual inspection of the slope of the trend lines indicates that P2's rate of change in MLU appeared slower in comparison to typically developing children. P3's growth in MLU appeared to occur at a similar rate to expected norms. P1 and P4's MLU showed a steeper gradient and therefore a faster rate of growth in comparison to typically developing children. P4 in particular showed good gains in getting closer to within 1SD of the expected norms. As there was no untreated control measure for MLU, it is possible these MLU changes could have occurred without the intervention. Further discussion regarding individual results are provided below.

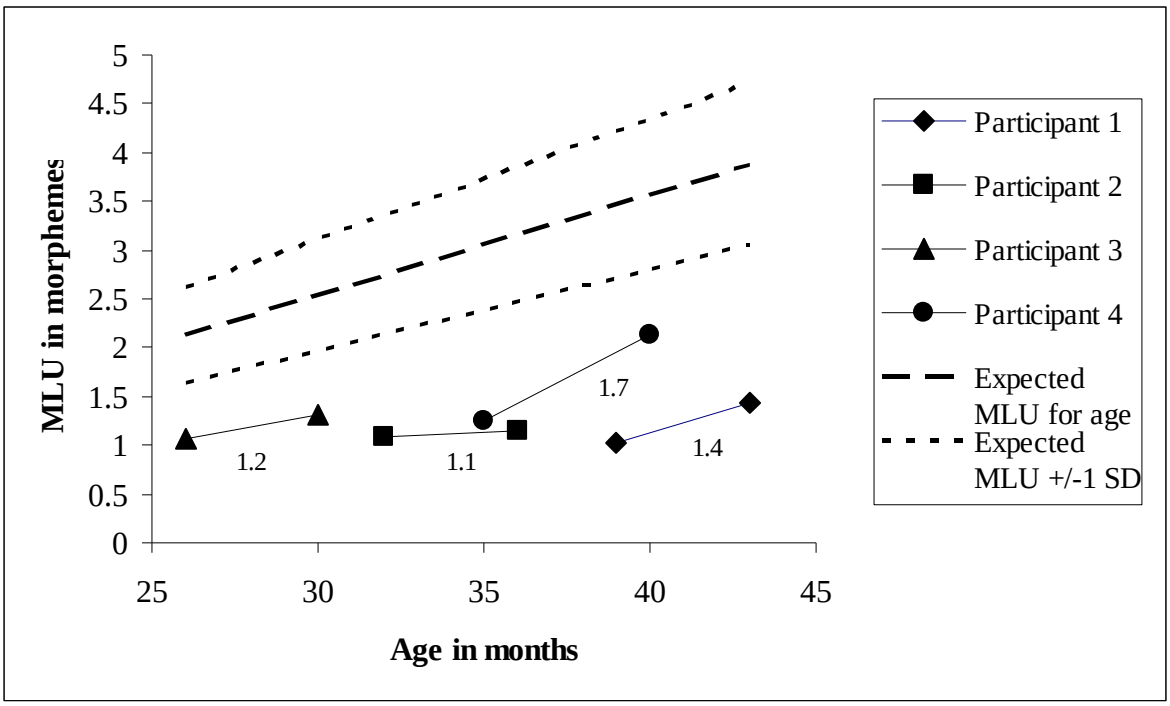


***Figure 3.*** **Relationship between age and mean length of utterance (MLU) in morphemes for the participants in comparison to typically developing children**: **MLU rate of change over 4 months = MLU post-intervention /MLU pre-intervention (Miller & Chapman, 1981; Portney & Watkins, 2009).**

**P1 Results Following Intervention**

The primary aim of this study was to determine whether targeting vocabulary, specifically verbs, would increase the participants' production of the target words during the probe tasks. Figure 4 illustrates that P1 did not use any of the target words during the baseline assessment. Visual inspection shows a significant increase in use of the target words during the intervention phase, in comparison to the baseline assessment and control word set. This increase was observed across each verb set and the results were maintained at the one-month post-intervention phase where P1 was observed to use all of the target words during the probe task.

P1 began to produce some of the target words in the first session of verb set 2 and 3. He also began to produce some of the control words as the sessions progressed. This may indicate a

possible element of natural maturation or learning mechanism beginning. It is observable however, that more correct productions occurred for the target words that received intervention than for the control words. This indicates that the treatment was effective in increasing P1's use of the target words.

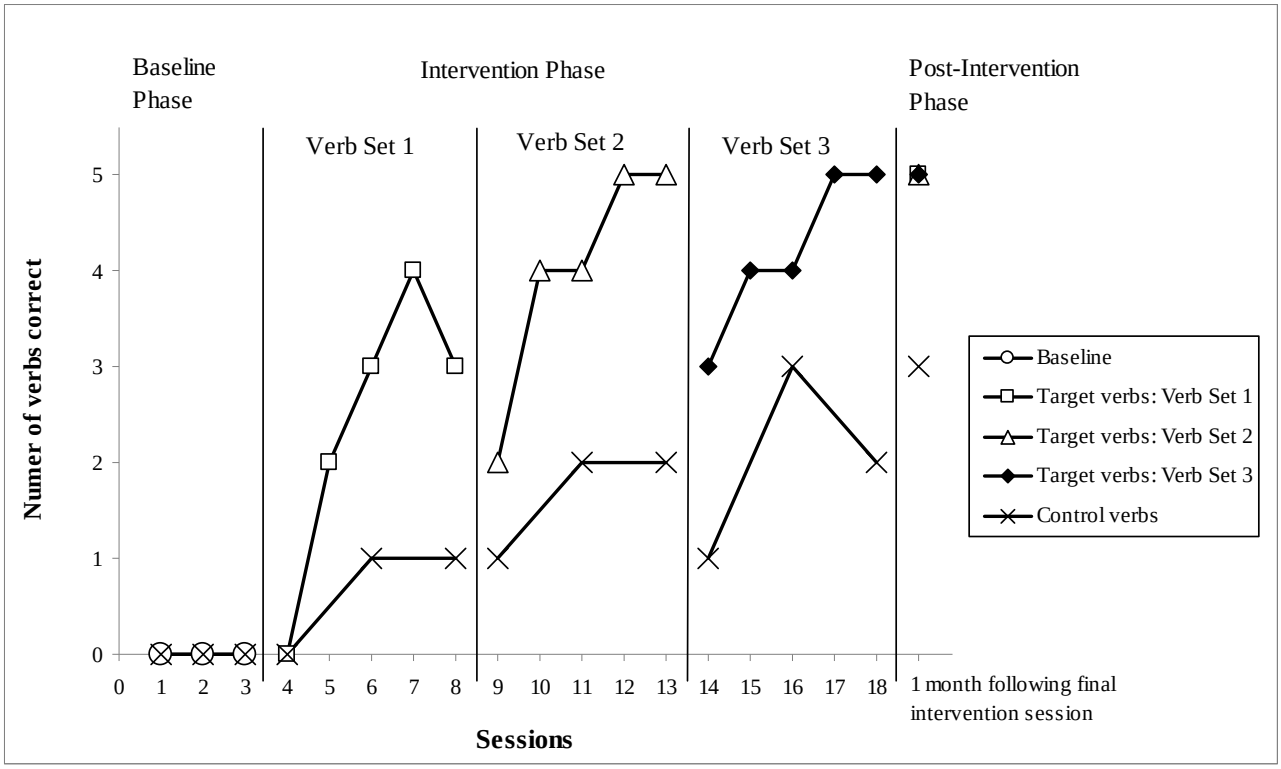


***Figure 4.*** **Target verbs used by Participant One.**

This study also aimed to investigate whether the intervention would affect the participants' MLU. The re-assessment results indicated that P1's MLU in morphemes increased from 1.02 to 1.43, as seen in Table 2. This was accompanied by significant increases in P1's use of action words, total words and number of different words.

Over a 16 week period, P1's MLU increased from 3.2 SD below the mean to 2.9 SD below (Miller & Chapman, 1981). His progress with expressive language, as measured by MLU, appeared to be accelerating, which is indicated by an increasing slope in figure 3. P1's MLU

increased at a faster rate of 1.4 over 4 months in comparison to typically developing children who showed an increase in MLU of 1.1 between the same age difference of 39 months to 42 months (Miller & Chapman, 1981; Portney & Watkins, 2009).

While the language sample was being taken during the re-assessment session, P1's father was observed to ask many closed questions, which required a single word or yes/no response. P1 also played with one toy for the majority of the time. P1's MLU therefore may not be an accurate representation of the amount of language he would typically produce while engaged in general play or conversation with others. P1 used two of the target words during the re-assessment language sample. His parents reported that he was using all of the target words in the home environment.

As P1's MLU may have been restricted in the re-assessment session by closed questions from his conversational partner, P1's mean syntactic length (MSL), the average number of words containing two or more morphemes, was also calculated to provide a wider analysis of utterance length (Klee, 1992). His MSL showed an increase from 2 to 2.4 at assessment and re-assessment. This indicates that while P1's utterance length was growing, his complexity of language was also increasing concurrently. Improvements in P1's complexity of language were also observed informally during the probe tasks as the intervention sessions progressed. P1 used the inflection '-ing' for 13 of the 15 target words at re-assessment compared with none at baseline. He also joined the target words into two-word sentences or longer for 8 of the 15 of the target words at the re-assessment. For example, he used "riding ute" and "wiping board". His complexity on the CDI improved from 0 to 5, with his parents reporting improvements in P1's use of regular and irregular plurals, irregular verbs, possessive markers and inflections.

At the re-assessment session, P1's father reported that he engaged in self-talk during play and more imitation attempts. He also commented that P1 appeared more confident communicating with others, both familiar and unfamiliar people. On the CDI at the initial assessment session

P1's father did not report any sentence use by P1. At the re-assessment session, he reported that P1 was using 3 word sentences consistently and had used a 5 word sentence, "Mum, light on now please". Staff at P1's preschool also reported noticing more talking from P1, which also coincided with his older brother leaving preschool to go to school.

**Table 2**

***Post-Intervention Results for Participant One***

| **Participant** | 1 | |
|---|---|---|
| Age in months | 43 months | |
| | **Pre-Intervention** | **Post-Intervention** |
| **Language sample** | | |
| MLU[a] in morphemes | 1.02 | 1.43 |
| MLU[a] z-score | -3.2 | -2.9 |
| Number of different words | 52 | 88 |
| MSL[b] | 2 | 2.4 |
| **CDI[c]** | | |
| Total words | 54 | 517 |
| Total words z-score[d] | -3.54 | 0.05 |
| Action Words Subtest[e] | 5 | 90 |
| Complexity[f] | 0 | 5 |
| Combining words | Not yet | Often |
| **Verbs** | | |
| Target verbs produced produced[g] | 0 | 15 |

*Note:* [a] MLU = Mean Length of Utterance in morphemes, where mean for age 30 months = 2.54 and standard deviation = 0.571 (Miller & Chapman, 1981). [b]MSL = Mean Syntactic Length, where mean of utterances containing 2 or more morphemes are calculated. [c] CDI = The MacArthur-Bates Communicative Development Inventory: Words & Sentences (New Zealand English Adaptation). [d] Based on American norms as New Zealand norms not available: Mean for age 30 months = 510.2 and standard deviation = 128.7 (Dale & Fenson, 1996) [e] Total action words = 103. [f] Section E of CDI. [g] Total verbs targeted during intervention = 15.

**P2 Results Following Intervention**

Figure 5 illustrates that P2 did not use any of the target words during the baseline assessment. Visual inspection indicates an increase in use of the target words during the intervention phase, in comparison to the baseline assessment and control word set. This occurred across each verb set, indicating the intervention was having a positive effect compared with no change to the control words that did not receive intervention. P2 maintained use of some of the acquired verbs during the post-intervention phase and did not acquire any of the control words. P2 began to show increases in use of the target words in sessions three, four and five for each verb set. It is possible these increases may have continued to include all the target words if more sessions had been included for each verb set. Perhaps also, P2 may have maintained use of the target words he acquired in the final session of verb set 3 at the re-assessment session, if had there been more sessions. P2 may have required a longer learning time to acquire the target words.

P2 was often non-compliant during the probe tasks across all phases. The probes were presented in a variety of different ways as part of fun activities to attempt to engage P2, however he often responded as a typical two year old child by wanting to play rather than participating. P2 sometimes gave no response to the probes or he frequently provided gestural responses, indicating his comprehension of the target words. For example, he made a kissing noise for the target word ‘kiss’. P2 was also observed to use more nouns than verbs to describe the target words in the probe tasks. For example, in the picture for ‘eat’, he named the ‘banana’ and ‘lunchbox’; for the target word ‘read’, he named the ‘book’. Increases in attention to the tasks may have resulted in further gains for P2.

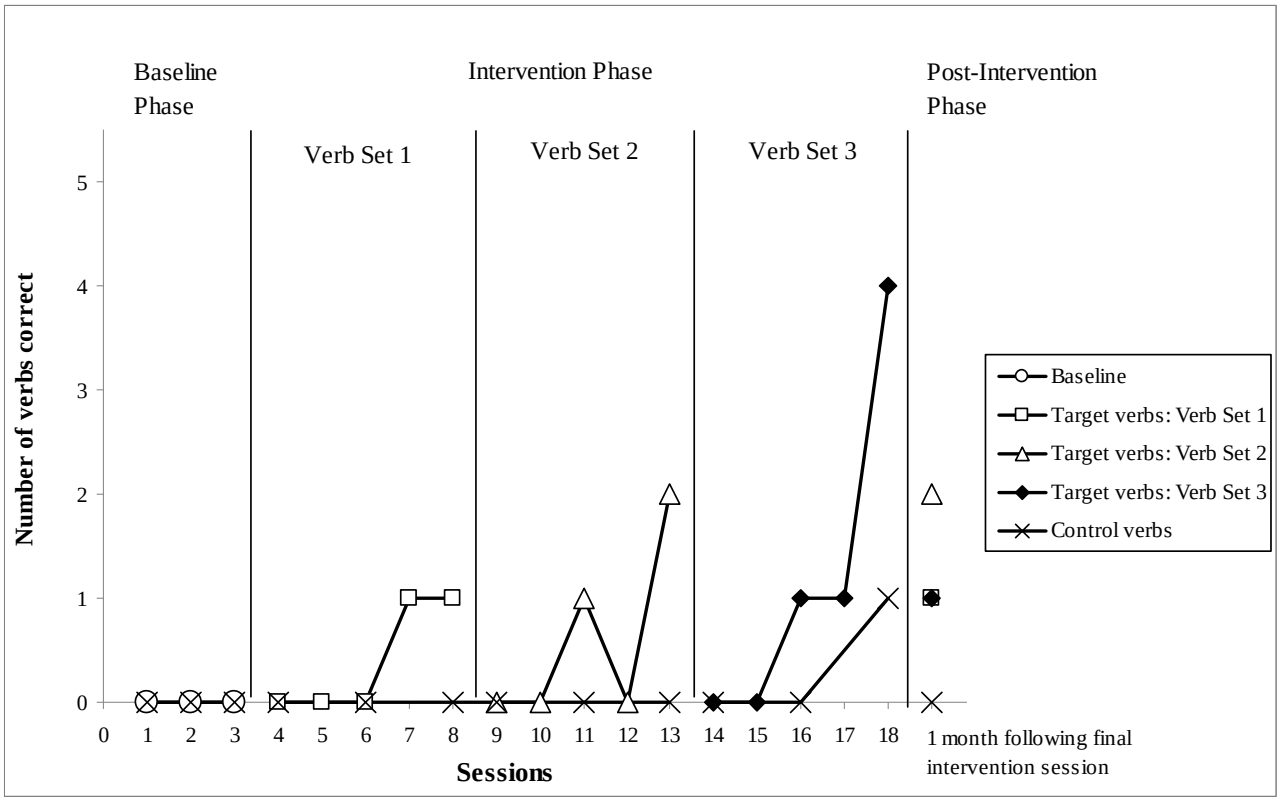


***Figure 5*. Target verbs used by Participant Two.**

The re-assessment results indicated that P2's MLU in morphemes increased from 1.08 to 1.14, as seen in Table 3. His standard deviation from the predicted MLU decreased slightly however, from 2.73 SD below the mean at the initial assessment to 2.91 SD below the mean at re-assessment (Miller & Chapman, 1981). P2's rate of progress with MLU did not appear to be keeping pace with typically developing children. This can be observed in figure 3 where P2's MLU progress appeared to occur at a slower rate, with a gentle slope observed in comparison to children with typically developing language. P2's rate of change for MLU across 4 months was 1.1 in comparison to typically developing children of the same age who had a rate of change of 1.2 (Miller & Chapman, 1981; Portney & Watkins, 2009).

During the final re-assessment session however, P2 was informally observed to engage in more spontaneous talking than the initial session. During the re-assessment language sample P2 used six of the fifteen target words. He also showed increases in productions of action words, total

words and number of different words, as seen in table 3. P2's total words are still significantly limited for his age however, which may be the reason for his restricted MLU.

P2's mother commented that his preschool noticed a large improvement with him talking more. On the CDI at the initial assessment session P2's mother reported that the longest sentence she had heard him use was, "up high". At the re-assessment session, she cited his longest sentence as being, "daddy back hurt". P2 engaged in lots of naming in the re-assessment session and his mother reported that he had been showing a particular interest in naming items at home or showing items and having adults name them. It is possible that P2 strongly relies on words being directly taught to him in order to use them and the learning mechanism of being able to generalise may not have started for him yet. His reduced attention to tasks may also have played a role, as he may not have been attending when adult models were being provided.

**Table 3**

***Post-Intervention Results for Participant Two***

| **Participant** | 2 | |
|---|---|---|
| Age in months | 36 months | |
| | **Pre-Intervention** | **Post-Intervention** |
| **Language Sample** | | |
| MLU[a] in morphemes | 1.08 | 1.14 |
| MLU[a] z-score | -2.73 | -2.91 |
| Number of different words | 30 | 82 |
| MSL[b] | 2 | 2.1 |
| **CDI[c]** | | |
| Total words | 63 | 157 |
| Total words z-score[d] | -3.47 | -2.74 |
| CDI Action Words Subtest[e] | 2 | 14 |
| Complexity[f] | 0 | Not completed |
| Combining words | Sometimes | Often |
| **Verbs** | | |
| Target verbs produced[g] | 0 | 4 |

*Note:* [a] MLU = Mean Length of Utterance in morphemes, where mean for age 30 months = 2.54 and standard deviation = 0.571 (Miller & Chapman, 1981). [b]MSL = Mean Syntactic Length, where mean of utterances containing 2 or more morphemes are calculated. [c] CDI = The MacArthur-Bates Communicative Development Inventory: Words & Sentences (New Zealand English Adaptation). [d] Based on American norms as New Zealand norms not available: Mean for age 30 months = 510.2 and standard deviation = 128.7 (Dale & Fenson, 1996) [e] Total action words = 103. [f] Section E of CDI. [g] Total verbs targeted during intervention = 15.

**P3 Results Following Intervention**

Figure 6 illustrates that P3 did not use any of the target words during the baseline assessment. Visual inspection shows a sharp increase in use of the target words during the intervention phase. P3 maintained use of the target verbs, using 12 of the 15 target words when tested at the post-intervention session. He confidently answered the probes immediately at re-assessment, appearing to easily understand the task with a desire to show he knew the answers. P3's use of the target words occurred at a faster rate than the control words, however it is observable that a noticeable increase in use of the control words occurred from the time of verb set 3. It may be that natural maturation or a learning mechanism started for P3 at this time or possibly a delayed treatment effect may be showing after an initial period of consolidation. P3's mother was also observed to implement the intervention strategies correctly and daily and was observed to incidentally model one of the control words during play, even though she was blind to the control words. Therefore, P3 may have started using the control words because they were being modelled to him outside of the intervention sessions.

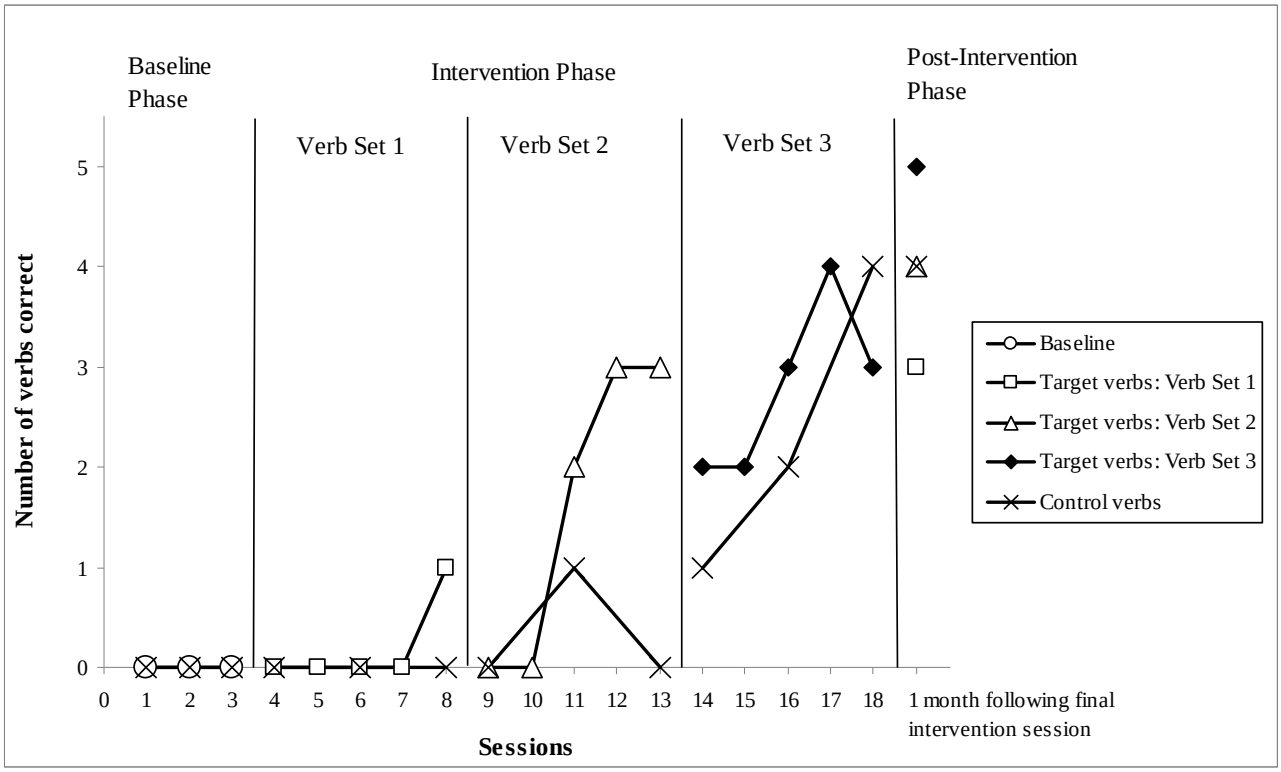


***Figure 6.*** **Target verbs used by Participant Three.**

The re-assessment results indicate that P3's MLU in morphemes increased from 1.06 to 1.32, as shown in Table 4. His rate of progress with MLU appears to be in accordance with that of typically developing children. This can be observed in Figure 3 which illustrates that while P3's MLU is lower than typically developing children, his progress appears to be occurring at the same rate as his same-age peers, as seen by a similar level of rising slope. P3's rate of change in MLU over 4 months was 1.2 in comparison to 1.2 for typically developing children (Miller & Chapman, 1981; Portney & Watkins, 2009). As seen in Table 4, P3's total words on the CDI significantly increased from 53 to 402, which moved him from the 5$^{th}$ percentile to the 30$^{th}$ percentile (Fenson et al., 2007). This may also account for his increasing use of the control words, as P3 was clearly acquiring a large number of developmentally appropriate words at a fast rate.

Improvements were also observed in P3's complexity of language, with an increase from 0 to 8 on the CDI. His mother reported improvements in use of inflections, prepositions, and irregular plurals. P3 used the inflection '-ing' for 12 of the 15 target words at the re-assessment session, compared with none at baseline. P3's responses remained at a single word level on the probe tasks at re-assessment. He did not show any increases in MSL during the re-assessment language sample. P3 became distracted during the language sample, by playing with a particular toy. He was observed to talk more during spontaneous conversation, which was observed by both his mother and the therapist. Considering the therapist observations and parent reports of improvements, P3's restricted play during the re-assessment language sample may have limited his MLU and MSL results.

At the post-intervention session, P3's mother reported that he was consistently engaging in lots of talking and often combining words. For example, at the initial assessment session, P3's mother reported on the CDI that the longest sentence she had heard him use was, "more cake". At the re-assessment session, she cited his longest sentence as being, "Mum, take my shoes off".

P3’s mother also commented that his older sisters were no longer talking for him as much, which may have been due to them learning to allow P3 time to talk or it may have been due to him talking more and no longer requiring interpretation.

**Table 4**

***Post-Intervention Results for Participant Three***

| **Participant** | 3 | |
|---|---|---|
| Age in months | 30 months | |
| | **Pre-Intervention** | **Post-Intervention** |
| **Language sample** | | |
| MLU[a] in morphemes | 1.06 | 1.32 |
| MLU[a] z-score | -2.19 | -2.13 |
| Number of different words | 27 | 67 |
| MSL[b] | 2 | 2 |
| **CDI[c]** | | |
| Total words | 53 | 402 |
| Total words z-score[d] | -1.66 | -0.84 |
| CDI Action Words Subtest[e] | 1 | 75 |
| Complexity[f] | 0 | 8 |
| Combining words | Sometimes | Often |
| **Verbs** | | |
| Target verbs achieved[g] | 0 | 12 |

*Note:* [a] MLU = Mean Length of Utterance in morphemes, where mean for age 30 months = 2.54 and standard deviation = 0.571 (Miller & Chapman, 1981). [b]MSL = Mean Syntactic Length, where mean of utterances containing 2 or more morphemes are calculated. [c] CDI = The MacArthur-Bates Communicative Development Inventory: Words & Sentences (New Zealand English Adaptation). [d] Based on American norms as New Zealand norms not available: Mean for age 30 months = 510.2 and standard deviation = 128.7 (Dale & Fenson, 1996) [e] Total action words = 103. [f] Section E of CDI. [g] Total verbs targeted during intervention = 15.

**P4 Results Following Intervention**

Figure 7 illustrates that P4 did not use any of the target words during the baseline assessment. Visual inspection indicates an increase in use of the target words during the intervention phase, in comparison to the baseline and control word set. This occurred across each verb set. P4 maintained use of more of the target verbs compared to control words at the post-intervention session, with only one control word being acquired. P4 began to produce some of the target words in the first session of verb set 1 and 3. As the probe tasks were administered at the start of each session, it is unlikely that the target verbs were modelled to P4 before the sessions, unless they were incidentally modelled as part of daily interactions. Therefore, this production of the target verbs at the first session may be an indication of natural maturation or a learning mechanism beginning. P4 only used one control word on one occasion however, indicating that the intervention was supporting his learning and maintenance of the target words in comparison to no intervention, where the control words were showing no increases in use. This indicates the intervention was effective in facilitating P4's use of the target words.

P4's responses on the production tasks varied. When productions were expected during the production probe task, he often appeared reluctant to participate. He sometimes took a long time to 'warm-up' at the start of the session, particularly if he had been playing outside before the session began. His mother also reported at the end of the intervention that she noticed he seemed quieter during afternoon sessions in comparison to mornings. The session times often changed due to the family moving out of their home as well as parental work commitments. It was observed however, that often during play or conversations with his mother, when P4 was talking about topics of interest to him or when there were no expectations for responses, P4 often exhibited many spontaneous productions.

P4 used only one target word during the re-assessment language sample. He used 9 of the 15 target words during the re-assessment probes and his mother reported that he was using all of them in the home environment.

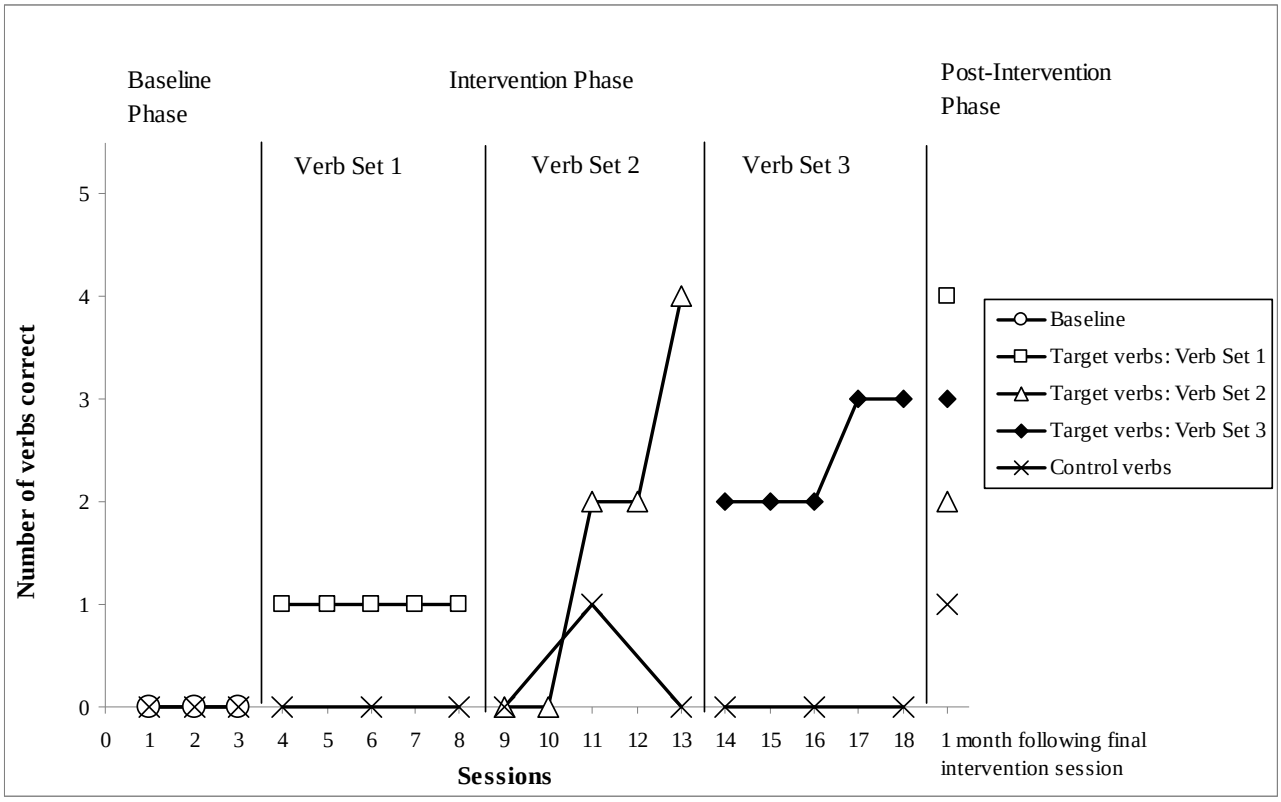


***Figure 7.*** **Target verbs used by Participant Four.**

The re-assessment results indicated that P4's MLU in morphemes increased from 1.26 to 2.14, as seen in Table 5. This resulted in his MLU moving from 2.67 SD below the mean to 1.85 SD below the mean over a 16 week period (Miller & Chapman, 1981). P3's progress with expressive language, as measured by MLU, appeared to occur at a faster rate in comparison to typically developing children. This can be visually observed by P4 displaying a steeper slope in comparison to that of typically developing children, as seen in Figure 3. P4's rate of change in MLU over a 4 month period was 1.7 in comparison to 1.2 for typically developing children, indicating a faster acceleration (Miller & Chapman, 1981; Portney & Watkins, 2009).

P4 also showed significant increases in use of action words, total words and number of different words, as seen in table 5. Improvements were also concurrently observed with P4's use of complexity of language. In the post-intervention session he used the inflection '-ing' for 11 of the 15 target words and combined many of the target words into 2-word phrases or longer. For example, he used, "kicking ball", "riding in the car", and "wiping the board". P4 showed a large increase in MSL moving from 2 to 3.9 at re-assessment, which indicates an increase in the length and complexity of the words he was using. This was complemented by his mother's report on the CDI that his complexity of language increased from 0 to 27 at re-assessment. His mother reported use of regular and irregular plurals, possessive markers, inflections, irregular past tense, prepositions and use of conjunctions.

At the re-assessment session, P4's mother reported noticing significantly more expressive communication from P4 with an overall increase in confidence, lots of talking, and consistent use of sentences. For example, at the initial assessment session, P4's mother reported on the CDI that the longest sentence she had heard him use was, "no way!" At the re-assessment session, she cited his longest sentence as being, "Can we go to the park on my scooter?" She also commented that P4's preschool has noticed a difference with an increase in talking.

**Table 5**

***Post-Intervention Results for Participant Four***

| **Participant** | 4 | |
|---|---|---|
| Age in months | 40 months | |
| | **Pre-Intervention** | **Post-Intervention** |
| **Language sample** | | |
| MLU[a] in morphemes | 1.26 | 2.14 |
| MLU[a] z-score | -2.67 | -1.85 |
| Number of different words | 56 | 89 |
| MSL[b] | 2 | 3.9 |
| **CDI[c]** | | |
| Total words | 48 | 512 |
| Total words z-score[d] | -3.59 | 0.01 |
| CDI Action Words Subtest[e] | 0 | 79 |
| Complexity[f] | 0 | 27 |
| Combining words | Sometimes | Often |
| **Verbs** | | |
| Target verbs produced[g] | 0 | 9 |

*Note:* [a] MLU = Mean Length of Utterance in morphemes, where mean for age 40 months = 3.57 and standard deviation = 0.774 (Miller & Chapman, 1981). [b] MSL = Mean Syntactic Length, where mean of utterances containing 2 or more morphemes are calculated. [c] CDI = The MacArthur-Bates Communicative Development Inventory: Words & Sentences (New Zealand English Adaptation). [d] Based on American norms as New Zealand norms not available: Mean for age 30 months = 510.2 and standard deviation = 128.7 (Dale & Fenson, 1996) [e] Total action words = 103. [f] Section E of CDI. [g] Total verbs targeted during intervention = 15.

**Summary of Results**

The primary aim of this study was to determine whether targeting vocabulary, specifically verbs, would increase the participants' use of the target words in the probe tasks. Overall the results indicate that the intervention had a positive effect on production of verbs in comparison to baseline and the control words. The target words that received intervention were used consistently more in comparison to control words. This effect was replicated across each verb set and for each participant. While the degree of verb use varied for each participant, the overall effect in comparison to the control words could clearly be seen on visual inspection of the figures. This indicates the intervention was effective in facilitating the participants' use of the target words. This finding that the words being targeted for treatment appear to have been learnt more rapidly than the control words are consistent with previous studies by Moore (2010) and (Weismer et al., 1993).

It was also of interest to observe whether there were also any increases to the participants' MLU following intervention. Increases to varying degrees were observed in sentence length, measured by MLU, for all participants with corresponding improvements in the participants' use of action words, total words and complexity of words.

# Discussion

The purpose of this study was to determine whether a verb-focused language intervention was effective in increasing the verb-vocabulary of toddlers with expressive language delay. In particular, the study investigated whether the treatment resulted in changes to participants' production of target verbs compared to control verbs. As hypothesised, the results of this study revealed that the intervention was effective in increasing the participants' use of the target words in comparison to control words. All the participants showed increased use of the target verbs, compared to the control words, in the intervention and post-intervention phase.

As vocabulary, and in particular verbs, play a fundamental role in grammatical development (Conti-Ramsden & Jones, 1997; Naigles et al., 2009; Watkins et al., 1993), it was also of interest to observe whether an intervention targeting verb-vocabulary would result in changes to the participants' total vocabulary and expressive language, as measured by MLU and MSL (measures of utterance length). The results indicated that at all the participants' demonstrated gains in MSL (except for P3) and MLU, as well as total use of words and action words (measured by the CDI). No conclusions about the role of the intervention can be made on the basis of these measures however, since maturation could also have been responsible, as there were no treatment and control conditions involved for these measures. These results do lend some support to previous studies (Girolametto et al., 1996; Moore, 2010; Weismer et al., 1993; Whitehurst et al., 1991) which found that vocabulary intervention targeting a set of words resulted in changes to total vocabulary and MLU in children who have expressive language delays. The current study and Moore's (2010) study focused on targeting verb vocabulary. Future studies that include a control element would be beneficial to determine whether the gains observed in MLU, MSL and total vocabulary are due to the intervention or other causes, such as natural maturation.

The findings of this study were consistent with previous studies by Moore (2010), Girolametto et al. (1996) and Weismer et al. (1993) who investigated the effectiveness of language modelling techniques to teach expressive use of target vocabulary. In particular, similar to the results of Moore (2010), verb-focused therapy using a focused language stimulation approach appeared to be an effective method of intervention. All four of the participants showed gains in their target words over the course of the intervention with fewer gains in control words. As in Moore (2010) and Weismer et al. (1993), the words being targeted for treatment were learnt more rapidly than the control words sampled. This study provides data that verb-focused intervention can be beneficial for late talkers by increasing their verb-vocabulary.

The strengths of this study include its (multiple baseline across behaviours) design with control element, inclusion of random assignment of words to target and control conditions, and valid and reliable measures, such as use of MLU, standardised language measures on the PLS-5 and support from parental report on the CDI (McReynolds & Kearns, 1983; Thompson, 2006). In the current intervention study, treatment effectiveness was determined by evidence of greater gains in the target verbs in comparison to the control verbs. As the design of this study included a control element, it is likely that the intervention caused the changes observed in the target verbs.

While the intervention design for the current study enabled inclusion of a control element for the target verbs, a further advantage of a single subject design is that it enables closer examination of each participant (Loeb & Armstrong, 2001). Upon inspection of the results, the rate and extent of change differed among the participants. These differences and the results from this study will be discussed on an individual basis for the participants.

While the intervention had a positive effect for all participants, it appeared particularly successful for two participants. Inspection of the re-assessment probe results indicated that it is unlikely that P2 and P4 would have improved without the intervention, as examination of the control words showed that P2 did not acquire any of the control words and P4 acquired only one.

This indicates that acquisition of the target verbs would have been unlikely without the input of intervention.

When examining the extent of gains following intervention, it was noted that while the intervention appeared to have a positive effect for P2, he seemed to make smaller gains with the target verbs compared to the other participants. P2 sometimes gave no response to the probes, provided gestural responses, or was non-compliant and did not participate to any extent. P2's reduced attention to tasks may have been a reflection of his young age of 32 months, as he preferred to play on his own rather than participating in the more structured probe tasks and storybook reading. P2's non-compliance may also have been an indication of general reduced attention. It is possible this may have been a contributing factor for his expressive language delay, as P2 may not have been attending when adult models were being provided.

While P1 and P3's use of the target words occurred at a faster rate than the control words, they also showed gains with use of some of the control words. As P1 and P3's language profiles appeared similar to the other participants, the reason for their increases in control words is unclear. Possibilities may include natural maturation, a learning mechanism beginning, a delayed treatment effect presenting, or greater parental input. P3's mother was an active participant in all sessions, demonstrated good use of the intervention techniques, and reported that she engaged in home practise on a daily basis. She was also observed to incidentally model one of the control words during play, even though she was blind to them. P1 also received regular home practise with his mother, father, and grandmother. P2 and P4's parents were less active in sessions by comparison. Therefore, potentially P1 and P3 received greater parental input at home considering their caregivers were more active in sessions. This may also in turn have provided more opportunity for the control words to be incidentally modelled during home practise as the language modelling techniques became more natural and were used more regularly by the parents.

## Theoretical Implications

The results from this study support previous evidence of the short-term efficacy of early intervention for children with expressive vocabulary delays (Girolametto et al., 1996). The finding that children who receive early short-term treatment are able to acquire the words targeted may assist in reducing parental anxiety, improving parent-child interactions, and providing children with practice opportunities to use words and construct short sentences during a key period of language development. The present study did not examine the effects of the intervention on parental anxiety or the quality of parent-child interactions. These areas may be of interest to investigate in future studies. Furthermore, there is some evidence to suggest that early language intervention may reduce childhood behavioural difficulties, enhance play development, and reduce the risk of later language and learning difficulties (Olswang & Bain, 1991; Paul, 1991; Weismer et al., 1994).

**Parental Input.** While no systematic analysis of parental language input was undertaken in this investigation, it is possible that the participants' parents' language changed. Girolametto et al.'s (1996) study examined parental input and found mothers language input to their toddlers to be less complex, presented at a slower pace, and focused more on specific target vocabulary following intervention. Vigil, Hodges and Klee (2005) also found that parents of children with language delays changed topics more frequently and responded less often than parents of children with typical language development. In the current study, minimal parental input may have been provided prior to intervention. It is possible that parents may have altered their input in response to their child's lack of language (Vigil et al., 2005). Through the process of participation in sessions and observation of the therapist, parents may have adjusted and increased their language input, as in Girolametto et al.'s (1996) study. While we did not analyse the nature of parental input, it was apparent from observing the interactions and discussions with the participants' parents during the intervention phase that they were providing appropriate

models, expanding on the child's utterances, and generally using language that was consistent with the participants' communicative level. It should be noted that 3 of the 4 participants were second or third children and their parents all individually commented that they had not received as much parental attention as their first child. Therefore, perhaps the level of language input had been less than their siblings.

Considerable parental input was observed for P1, who also showed significant increases in use of target words and control words. His sessions were attended by either his mother, father, or grandmother who all actively participated and reported that they all practised with P1 regularly at home. Alternately, P2 demonstrated small gains with the target words. His mother attended the sessions with minimal participation. While P2's mother reported that she practised regularly at home, perhaps the quantity of practise was less by comparison to P1 having three adults practising regularly at various times outside of clinic sessions.

**Targeting Verbs.** The literature suggests that some children with expressive language delays have increased difficulty both acquiring verbs in their lexicon and difficulty using them appropriately in sentences (Hadley, 1998). At the time of the assessment, all the participants in the current study had few or no verbs in their lexicon. P2 particularly seemed to struggle with acquiring the target verbs. He was observed to use more nouns than verbs to describe the target words in the probe tasks throughout the intervention phase. His overall acquisition of the target verbs was low, achieving only 4 of the 15 verbs. His results may support the findings from Riches et al.'s (2005) study which indicated that children with language difficulties show poor retention of recently acquired verbs. Verbs may be difficult to recall and require more frequent models in order to be retained. Conti-Ramsden and Jones (1997) suggested that children with specific language impairment may experience particular difficulty with verbs. P2's difficulty with verb acquisition may therefore potentially be an early indication of ongoing difficulties with language development

Despite the importance of verbs for language development, they have been the focus of few intervention studies. The current study has added to the literature by demonstrating that verb-focused intervention can increase the verb lexicon of young expressively delayed children. Further research into the use of verbs as targets in vocabulary intervention is warranted, considering the small number of participants (N=4) in the current study.

**Intervention Approach.** It is important to also further consider the intervention approach used in this study. The current study replicated the hybrid focused stimulation approach used in Moore (2010), which included structured teaching of target words, use of the target words in story-book reading, and focused stimulation of the target verbs during play. Other interventions that have also been successful in encouraging vocabulary growth with this population include Milieu approaches (Whitehurst et al., 1991) and general stimulation approaches (Girolametto et al., 1996; Robertson & Weismer, 1999). Studies comparing the effectiveness of different therapy approaches have been undertaken with school-aged children with SLI (Fey et al., 1993), however comparisons of therapy approaches are limited among the late-talking population. Therefore, research into the relative effectiveness of different approaches to vocabulary intervention among late-talkers is required.

Factors relating more specifically to the administration of the intervention should be considered as well. Girolametto et al.'s (1996) results indicated that children may not require productive practice to support words in memory, which is provided by using a modelling plus elicited imitation technique. However, Weismer et al. (1993) reasoned that modelling plus elicited imitation should be a more effective procedure. This is because it provides opportunities to produce the target. This is likely to more actively engage the child in the activity as well as provide opportunities for feedback (which also acts as another model) regarding the correctness of the approximations or productions of the target. Furthermore, Weismer et al. (1993) reasoned

that incorporating elicited imitations as well as modelling would be more effective for late talkers as they have not appeared to have benefitted from models only.

The current study did not compare treatment methods as in Weismer et al.'s (1993) study, and instead only used modelling with opportunities for elicited production during focused stimulation play. Informal observations indicated that elicited imitation was needed to facilitate productive language among the participants, as it helped create an expectation for an expressive response. At the time of the assessment phase, all of the participants were often communicating relatively effectively by pointing, nodding, and gesturing and therefore required encouragement to use expressive language.

P1 particularly appeared to thrive when elicited imitation was used and he provided the expected response. Positive reinforcement also appeared to be key, as he seemed pleased when acknowledgement was given that he had been understood, even if it had been an approximation of the target word. This in turn appeared to facilitate increased expressive responses from P1. Comparison of different treatment methods may be useful for future studies.

**Child Characteristics.** Furthermore, there are a number of factors that could affect the relative effectiveness of language intervention approaches, such as certain child characteristics, including their linguistic level, readiness to acquire the target, case history, learning style and personality (Weismer et al., 1993). While the current study was not designed to address such issues, we can speculate that certain participant characteristics, such as readiness to learn and personality factors may have had an impact on the participants' responsiveness to treatment. Paul (1991) discussed the possibility that social skills deficits may be associated with children who have expressive language delays. Paul (1991) found that the children in the expressive language delay group produced significantly fewer communicative initiations and appeared less interested in interacting with others, even non-verbally. Paul et al. (1991) also found that the majority of

late talkers continued to show deficits in social development a year later at age 3. Paul et al. (1991) suggested that it could be that delayed language and poor socialisation are both related to an underlying deficit in motivation to interact. Late talkers may be less motivated to interact, which results in less need and opportunities to acquire language, even when there is potential to do so.

These observations regarding social skills could apply to P4, whose personality may have played a role in his expressive language delay. P4 did not appear to be a 'talker', preferring to play outside and generally be involved in physical activities. His responses on the production tasks varied, as did his enthusiasm for the intervention sessions. While some days he appeared eager to participate in sessions, other days he took a long time to 'warm-up' at the start of the session, particularly if he had been playing outside before the session began. It was observed however, that often during play or conversations with his mother, when P4 was talking about topics of interest to him or when he did not think he was being observed, P4 often exhibited many spontaneous productions. Thus, he may be a child who only talks when he feels it is necessary to do so.

Readiness to learn may also have played a role in target acquisition for some of the participants. Of particular interest is P3. The intervention was successful for P3, as his use of the target words occurred at a faster rate than the control words. However, it was observable that a noticeable increase in use of the control words also occurred from the time of verb set 3. It may be that natural maturation or a learning mechanism started for P3 at this time or that a delayed treatment effect became apparent at this time after a period of consolidation. P3's mother was also observed to implement the intervention strategies correctly and daily and was also observed to incidentally model one of the control words during play, even though she was blind to the control words. Therefore, P3 may also have started using the control words because they were being incidentally modelled to him outside of the intervention sessions.

## Clinical Implications

The results of this study have a number of implications for clinical intervention. Primarily they indicate that verb-focused intervention can result in verb-vocabulary improvements for children who are late talkers. It potentially may also result in wider expressive language gains.

The results suggest that the intervention provides short-term gains among late-talkers. While it is debatable in the literature whether late talkers will 'catch-up' to their peers or not, Olswang and Bain (1991) suggest that intervention to facilitate late talkers language-learning is still beneficial, as it reduces the risk of secondary delays such as metalinguistic knowledge and social-emotional development. Some of these associated delays were evident in P1. His parents reported that, at the time of the assessment, he was shy, aware of his difficulties, and often withdrew from conversations and interactions with others. During the re-assessment phase, P1's parents reported that his confidence had improved; he initiated more and spoke to a wide variety of people. Noticeable improvements were also observed in P1's parents who, by the end of therapy, provided more comments and had reduced their 'teacher/instructor' role of frequently asking questions. P1's parents also appeared more comfortable playing with P1 by following his lead and commenting on items of interest to him. This highlights that perhaps clinicians should also consider the associated benefits of the intervention beyond lexical development, such as improved parent-child interactions and social skill development. Therefore, factors other than immediately observable language gains may be valid reasons for considering early intervention for late talkers.

While the results indicated significant positive change in verb-vocabulary for all participants, some participants showed more growth than others. The potential reasons for these varied results should be considered by clinicians when determining if an intervention approach is suitable for their clients. P2's acquisition of the target verbs was lower than that of the other participants. His progress may have been due to reduced attention and lack of compliance or less parental input

outside of clinic sessions, compared to the other participants. P2's reduced participation in the probe tasks and story-book reading in the majority of sessions meant that sessions often consisted of only focused language stimulation in play. During focused stimulation P2 often did not use target words in the opportunities provided, but his mother reported he was using them in other environments. Thus, it is possible that P2 achieved more target verbs than the probes revealed, as he often did not participate in the tasks. Therapists working with young children with participation difficulties may therefore consider the less demanding focused language stimulation approach without more structured tasks, such as probes and story-book reading. It was pleasing to observe that, despite P2's reduced attention to some tasks, he still made gains with the target words, thereby indicating the effectiveness of the intervention.

The intervention for this study took place in different settings, such as the participants' home and different clinics. This suggests that the intervention can be successfully implemented across environments. While the primary intervention agent in this study was a qualified Speech Language Therapist, parents participated in the intervention as well. Observations revealed that all the parents appropriately modelled the target words, indicating that parents may also be able to successfully implement the intervention. Parents acting successfully as intervention agents have also been supported by Girolametto et al. (1996).

As the majority of clinicians face ongoing service restrictions in their daily work, it is important they select an intervention approach and targets that are likely to increase their clients' expressive language to its maximum potential. While vocabulary development is a common target choice for children with delayed expressive language, there have been few comparisons of target choices (such as nouns versus verbs) in the literature. The selection of verbs as targets should be taken into consideration by clinicians, as verbs play a fundamental role in language development (Conti-Ramsden & Jones, 1997; Naigles et al., 2009; Watkins et al., 1993) . Targeting verbs may encourage early grammatical development and sentence production, as

evidenced by increases in MLU in Moore (2010) and the current study. Further research to determine the effect of verb-focused intervention on productive language is necessary.

**Limitations**

While this study demonstrated the effectiveness of the intervention by increasing the verbs targeted, it does not establish whether the treatment actually promoted expressive language beyond the words targeted. The study did not incorporate controls against maturation for MLU and therefore is unable to directly determine whether the intervention was responsible for the observed improvements in sentence length. The current study measured the participants' MLU pre- and post-intervention under controlled conditions, by using the same environment, caregiver, and set of toys. In the re-assessment phase however, it was noted that two participants became fixated on play with one toy of interest, which may have restricted their MLU and MSL results. Therefore, several samples in different contexts with a range of materials, conversational partners, and situations may have been more informative in comparing variability of language use for the individual participants and may also have provided greater opportunity for the participants to use the newly acquired target verbs post intervention (Miller & Chapman, 1981). The diary method used in Naigles et al.'s (2009), study may also be an effective means for collecting continuous target word and sentence data.

Another limitation of this study was the sample size. This study included only four participants and therefore, the extent to which the findings can be generalised to the larger population of late talkers is unknown. A larger sample would have provided increased external validity and further information on the profiles of children who make greater gains than others from this population. Furthermore, the current study did not include participants who had receptive language delays and therefore the results of this study may only be generalised to similar groups of children who have expressive language delays only. Further research including participants who also have

cognitive and comprehension impairments may be required in order to determine if this intervention approach produces similar results in children exhibiting such profiles.

The population sampled in this study consisted of children from educated middle-class families. The parents in this study all appeared to be highly motivated, as they voluntarily engaged in home practise outside of the intervention sessions and frequently participated in the sessions. While the parents in the current study all responded well to treatment suggestions, they may not reflect the responses from other families from different backgrounds and for whom intervention is recommended rather than sought. The degree to which parents were involved in sessions and facilitated their child's language development outside of the therapy environment may have played a role in the progress made by the participants. Studying the effects of these factors in future studies is warranted.

The current study has reported on data gathered over a 4 month period and demonstrates the short-term efficacy of the intervention. However, there is no clear indication of the long-term outcome of the intervention for these participants. Therefore, a study with long-term follow-up to measure the target verbs, MLU and MSL growth is essential.

**Future Research**

This study has demonstrated positive results for a verb-focused intervention approach and also raised a number of issues that may be addressed in future research. It would be of interest to determine whether similar results would be found if studying a larger sample of participants. Large group designs with participants randomly assigned to treatment or no treatment conditions would strengthen the validity of this study and provide greater insight into the various profiles of late talkers. Furthermore, it would be useful to establish whether the gains shown by the participants could be maintained over a longer period of time than four months. If language intervention is to have significant and lasting effects on the social and linguistic abilities of

children with language delays, intervention that promotes quick gains that are sustained over long periods are needed (Fey et al., 1993).

The intervention approach and targets selected for late talkers is also of interest for future research. The current study utilised a therapist-administered intervention with parental participation and home practise encouraged. However, the level and quality of parental involvement was not measured. Future studies should consider including and monitoring structured home practise activities as part of the intervention. This may further encourage parental modelling, leading to increased production practise opportunities in the home environment, which is likely to facilitate greater improvements in the participants' expressive language. Future studies could focus on determining which of these is the key element that facilitates positive intervention outcomes.

The current study has indicated that intervening with one word class, verbs, is effective in increasing late talkers' verb-vocabulary. There may also be a causal relationship between verb-focused intervention and wider language gains. Future study designs may consider incorporating a control element for MLU, MSL and total words acquired to determine the extent to which verb acquisition influences grammatical properties, sentence production and overall vocabulary or if the gains are due to other elements, such as natural maturation. Furthermore, as limited studies are available in this area of verb-focused intervention and late talkers, it would be beneficial for future studies to determine whether verbs or other word classes are more efficient at facilitating expressive language.

The present study has provided data demonstrating that late talkers are responsive to intervention and the results provide evidence supporting a verb-focused intervention approach for improving their verb vocabulary. Further evidence in this area would provide greater support for clinicians

when faced with decisions regarding whether to intervene or not with late talkers and when selecting the most appropriate intervention approach and target words.

## Appendix A

## University of Canterbury Human Ethics Committee approval letter to conduct research

UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2012/139

15 October 2012

Charmain Moyle
Department of Communication Disorders
UNIVERSITY OF CANTERBURY

Dear Charmain

The Human Ethics Committee advises that your research proposal "Teaching vocabulary to young children" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 24 September 2012.

Best wishes for your project.

Yours sincerely

*pp* LGriffioen

Lindsey MacDonald
***Chair***
***University of Canterbury Human Ethics Committee***

**Appendix B**

**Information sheet for parents/caregivers**

Charmain Moyle
C/o Department of Communication Disorders
University of Canterbury
Private Bag 4800
Christchurch
Ph: +64 3 378-7726
Email: charmain.moyle@canterbury.ac.nz

UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

## PARENT/CAREGIVER INFORMATION FORM

### Teaching Vocabulary to Young Children

Your child is invited to participate in the above named research project. Before deciding if you'd like to participate, please read through this information form. If you have any questions about the project, feel free to get in touch with Charmain Moyle by phone or email, her contact details are at the top of this page.

**What is the purpose of the project?**
Some children learn to talk quickly and some take their time. Many two-year-olds are joining words together in sentences while other children take a bit longer. The project aims to explore the effects of using verbs (action words) in speech language therapy to encourage spoken language and longer sentences in young children.

**What is involved?**
Initially your child will be required to participate in 2-3 one-hour assessment sessions. A qualified Speech Language Therapist (Charmain Moyle) will assess your child's vocabulary, sentence length, understanding, and spoken language during these sessions. Assessment will be conducted through play and by providing your child with opportunities to use target words (or potential target words).

During this time, you will also be asked to complete two forms, which will take approximately 20 minutes. One form is about your family and your child's birth history and speech and language development. The other is about your child's current use of words and sentences to communicate. Additionally your child will be asked to undergo a free hearing test at the Speech and Hearing Clinic, University of Canterbury, to eliminate hearing impairment as a factor in his/her language delay.

If your child meets the criteria for this study, your child's involvement in this project will be participation in twice-weekly 45-minute speech language sessions over a 10-week period. The therapy will focus on modelling target words as part of play-based activities and storybook reading.

Following the 10 weeks of therapy, your child will be asked to participate in 2-3 one-hour

re-assessment sessions, which will follow a similar format to the initial assessment. This will occur 6 months after the first assessment.

All sessions will be recorded to enable review for data analysis.

You will be offered a summary of results following the assessment and therapy being completed.

You have the right to withdraw your child from the project at any time, including withdrawal of any information provided.

There aren't any known risks to you or your child as a result of participating in this study.

**What will happen to the information about my child?**
You may be assured of the complete confidentiality of data gathered in this study. The results of the project may be published or presented at professional conferences, however the identity of your child and family will be preserved through use of pseudonyms or codes in place of identifying names.

To ensure confidentiality, all identifying information will be stored in a locked filing cabinet within a secure clinic office. Only those involved with this research project have keyed access to this cabinet. Charmain Moyle and supervisors Prof. Thomas Klee and Dr Catherine Moran are the only persons with authorised access to identifying information.

**What do I do next?**
If you agree for your child to participate in this project, please complete the attached consent form and return to Charmain Moyle in the envelope provided by (date/month).

**Other information:**
The project is being carried out as a requirement for a Master of Science in Speech Language Science by Charmain Moyle under the supervision of Prof. Thomas Klee, who can be contacted at 364 2987 extension 8501. He will be happy to discuss any concerns you may have regarding participation in the project.

The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

Any complaints can be addressed to The Chair, University of Canterbury Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch.

**Appendix C**

**Consent form for parents/caregivers**

Charmain Moyle
C/o Department of Communication Disorders
University of Canterbury
Private Bag 4800
Christchurch
Ph: +64 3 378-7726
Email: charmain.moyle@canterbury.ac.nz

UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

## PARENT/CAREGIVER CONSENT FORM

### Teaching Vocabulary to Young Children

I have read and understood the information that was given to me regarding the research project named above. I have had the opportunity to ask questions and have them answered.

I understand that my participation in this project is voluntary and that I may at any time withdraw my child from the project, including withdrawal of any information my child or I have provided.

I understand that the information you collect from me will remain confidential and will be securely stored in a locked cabinet in a secure clinic office, as per standard clinic procedure. I understand that any presentations or publications resulting from this project will not refer to me or anyone in my family by name.

On this basis I agree for my child to take part as a participant in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved. I consent to the results of these assessments being made available for future studies if required.

I note that this project has been reviewed ***and approved*** by the University of Canterbury Human Ethics Committee.

MY CHILD'S NAME (please print):……

MY NAME (please print): ……

My signature: ……

Date: ……

Address: ……

**Appendix D**

**Case History form**

## SPEECH LANGUAGE & BACKGROUND INFORMATION

Parent/caregiver completing form: Date:

| | | | |
|---|---|---|---|
| Child's name: | | Date of birth: | |
| Child's gender: | | Preschool: | |
| Referred by: | | GP/Specialists: | |

In which country was your child born?

- ☐ New Zealand
- ☐ Other; please indicate where: _____
  → If other, how long has this child lived in New Zealand? _____

Which ethnic group does your child belong to? Tick the one or ones which apply.

- ☐ New Zealand European
- ☐ Māori If yes, iwi_____
- ☐ Samoan
- ☐ Cook Island Maori
- ☐ Tongan
- ☐ Niuean
- ☐ Chinese
- ☐ Indian
- ☐ other such as Dutch, Japanese, Tokelauan; please state: _____

What is your child's main language?

Are any other languages spoken in the child's home? No _____ Yes _____
→ If yes, which ones? _____

**Parent Concerns:**

Do you have any concerns about your child's ability to communicate? Yes ___ No ___
→ If yes, please explain:

**Speech and Language:**

Did your child babble as a baby?

When did your child start saying their first words?

How does your child ask for things he/she wants at home?

Does your child point/show you something to get their message across?

Does / how does your child comment on things?

Is there anything you often do to help your child communicate?

**Birth and Early Infancy:**

Were there any complications during pregnancy/delivery/post-natal**?**

Was your child born prematurely? No _____ Yes _____
→ If yes, by how many weeks? _____

Child's birth weight: _____ grams (*or* _____lbs _____oz)

Child's birth order: 1st _____ 2nd _____ 3rd _____ 4th or more

Was your child born a twin? No _____ Yes _____

Any feeding concerns with:
- Breast/bottle?
- Solids?
- Chewing?

Does your childe eat a range of food?

Does your child persistently drool/dribble?

**Motor Development**

Do you have any motor concerns for your child? e.g. any delays in sitting, crawling, standing, walking:

Is your child toilet trained?

**Health/Illness and Accidents:**

Hearing

- Do you have any concerns about this child's ability to hear? Yes___ No ___
- When was your child's last hearing check?
- Has your child had frequent ear infections?
- Does your child have grommets?

Medical

- Has your child ever had any major health problems? No _____ Yes _____
  → If yes, what are they? (e.g. illnesses, accidents, diagnoses, allergies):

**Family and Relationships:**

Number of children in family, *including* this child:

Members at home:

Family history of speech and/or learning difficulties:

- Has anyone in the child's family had speech, language or learning problems (for example, the child's mother, father, brothers, sisters or grandparents)?
  No _____ Yes _____
  → If yes, who were they?
  _____

How would you describe your child's relationships with peers/siblings/adults?

Does your child attend a day care or an early childhood education programme or cared for regularly by anyone else? No _____ Yes _____

→ If yes, how many hours per week on average? _____

Kindergarten/preschool:

Days/times attendance:

What are some daily activities you do with your child and how they are going?

Can you sit with your child and look through a book together?

***The next set of questions is about you.***

Your name: _____

What is your relationship to the child named on page 1? _____

In which country were you born?

- ☐ New Zealand
- ☐ Australia
- ☐ England
- ☐ China (People's Republic of)
- ☐ India
- ☐ South Africa
- ☐ Samoa
- ☐ Cook Islands
- ☐ other; please indicate which: _____

If you live in New Zealand but were not born here, answer this question:

When did you first arrive to live in New Zealand?

Month (if known) _____ Year _____

Which ethnic group do you belong to? Tick the one or ones which apply to you.

- ☐ New Zealand European
- ☐ Māori
- ☐ Samoan
- ☐ Cook Island Maori
- ☐ Tongan
- ☐ Niuean
- ☐ Chinese
- ☐ Indian
- ☐ other such as Dutch, Japanese, Tokelauan; please state: _____

What is your highest secondary school qualification?

- ☐ None
- ☐ NZ School Certificate in one or more subjects *or*
  National Certificate level 1 *or*
  NCEA level 1
- ☐ NZ Sixth Form Certificate in one or more subjects *or*
  National Certificate level 2 *or*
  NZ UE before 1986 in one of more subjects *or*
  NCEA level 2
- ☐ NZ Higher School Certificate *or*
  Higher Leaving Certificate *or*
  NZ University Bursary / Scholarship *or*
  National Certificate Level 3 *or*
  NCEA 3 *or*
  NZ Scholarship
- ☐ other secondary school qualification gained in NZ
- ☐ other secondary school qualification gained overseas

Apart from secondary school qualifications, do you have another completed qualification?

No _____ Yes _____

→ If yes, what is it? _____

What is your occupation? _____

***Thank you for your time and effort.***

If you have any queries, please don't hesitate to contact me:

Charmain Moyle
Speech Language Therapist
Ph: 378-7726

**Appendix E**

**Toys provided for play between parent and participant during the language sample assessment and re-assessment:**

- Barn with farm animals, tractor, and people
- Car garage with 2 cars
- Set of blocks
- Trucks x2
- Books x2
  - Hill, E. (2009). *Where's Spot?*. Penguin Books Ltd
  - Brooks, F. (2005). *Diggers.* Usborne Publishing Ltd.
- Baby dolls x2, blanket, cloths, bottle, brush, cups, teapots, knives, forks, spoons, plates, food items

## Appendix F

## Target and control word lists

**Participant 1**

| Verb set 1 | Verb set 2 | Verb set 3 | Control |
|---|---|---|---|
| Bite | Ride | Eat | Open |
| Kiss | Cook | Hug | Wait |
| Walk | Wipe | Read | Run |
| Catch | Kick | Fall | Cut |
| Sit | Dance | Sing | Pull |

**Participant 2**

| Verb set 1 | Verb set 2 | Verb set 3 | Control |
|---|---|---|---|
| Bite | Catch | Run | Sing |
| Eat | Kiss | Hug | Dance |
| Cook | Pull | Fall | Kick |
| Ride | Sit | Wash | Read |
| Push | Open | Go | Walk |

**Participant 3**

| Verb set 1 | Verb set 2 | Verb set 3 | Control |
|---|---|---|---|
| Eat | Sing | Cook | Ride |
| Bite | Run | Pull | Hug |
| Catch | Push | Go | Cut |
| Dance | Sit | Walk | Read |
| Fall | Kiss | Wash | Open |

**Participant 4**

| Verb set 1 | Verb set 2 | Verb set 3 | Control |
|---|---|---|---|
| Walk | Push | Bite | Talk |
| Kick | Hug | Pull | Touch |
| Read | Dance | Build | Give |
| Go | Wash | Wipe | Paint |
| Ride | Carry | Wait | Write |

**Appendix G**

**Intervention procedures**

- The intervention occurred twice weekly for a total of fifteen sessions.
- There were four verb sets:
    - Three verb sets were treated (ie., received intervention)
    - One verb set remained untreated throughout the study (control verb set).
    - Each verb set contained five target words
- Five sessions took place for each verb set.
- Parents were able to participate in all the sessions, if they chose to.

*Probe task*
At the beginning of each session, a probe task was completed for a period of five to ten minutes. Pictures of the target words and control words were presented randomly, as part of a fun activity. The parents were kept blind to the control words. The participant was asked to describe each picture they saw e.g. "Tell me what you see". Non-specific feedback was provided.

*Structured teaching*
Following the probe task, structured teaching of the target words took place for five minutes. Pictures of target words (the same picture cards that were used in the probe task) were shown to the participant. The participant was asked to describe the picture. Reinforcing feedback containing the target word was provided e.g. "That's right, the girl is reading".

If the participant did not use the target word, repeated models were provided with emphasis on the target word e.g. "The boy is walking. He's walking to the park. The boy and mum are going for a walk".

*Structured teaching in storybook reading*
A storybook reading activity took place for 10 minutes following the structured teaching task. Books containing the target words were chosen. The participant was expected to attend to the task, and opportunities were provided for elicited production, however the child was not required to produce the target words.

The therapist modelled the target words according to many of Fey's (2003) principles and the principles of focused language stimulation (Lederer, 2002). These included highlighting the target words by using repetition, intonation and stress. Sentence recasts were used to model the target word in well-formed phases and sentences. To clarify the word's meaning, illustrations were pointed at, gestures used, and animated facial expressions employed to clarify the meaning of the target word.

Further encouragement of child engagement with the book was undertaken by using interactive books when possible (such as 'lift-the-flaps'), being face-to-face with the child, allow the child to hold the book, making comments, and asking the child questions throughout the story to ensure an interactive experience.

*Focused Stimulation Play*
Focused language stimulation play with the participant occurred for approximately twenty-five minutes. During this play, the therapist modelled the target words according to many of Fey's (2003) principles and the principles of focused language stimulation (Lederer, 2002). The therapist provided frequent and highly concentrated models of the target words and manipulated the social and linguistic environment to create opportunities for participants to use the target

words. Toys were chosen by the therapist that allowed for natural opportunities to use the target words. The target words were highlighted and emphasised by using repetition, intonation and stress. Sentence recasts were used to model the target word in well-formed phases and sentences. To clarify the word's meaning, the target words were illustrated through demonstration with the toys, use of gestures and play-acting.

Opportunities were provided for elicited production, however the child was not required to produce the target words.

**Appendix H**

Story books used during intervention:

- *Baby's Food* by Camilla Jessel
- *Catch it, Kitty* by Nicola Parsons
- *Doing the Washing* by Sarah Garland
- *How do I eat it?* by Shigeo Watanabe
- *Hugless Douglas* by David Melling
- *Hungry Harry* by Joanne Partis
- *I can build a house* Shigeo Watanabe
- *I Like Books* by Anthony Browne
- *I went walking* by Sue Machin & Julie Vivas
- *No More Kissing* by Emma Chichester Clark
- *Old McDonald had a farm by M Twinn*
- *Patch Plays Fetch* by Treehouse Children's Books Ltd
- *Ready, Steady, Go* by Shigeo Watanabe
- *Spot's First Walk* by Erica Hill
- *Ten in the bed* by Penny Dale
- *The Elephant Ride* by Mary O'Toole
- *Walk, Ride, Run* by Jenny Giles
- *Wash-a-Bye Bear* by Thomas Docherty

**Appendix I**

Toys used during intervention:

- Tractor and trailer with farmer, pig, sheep, cow, chicken
- Boat with car (Little Tikes)
- Wind-up walking robot
- Play cooking set: oven, pot, pan, lid, ladle, spoon
- Elefun and friends: The butterfly catching game
- Magnetic drawing board
- Whiteboard, pen, cloth
- Baby dolls, cloth, soap, bath, blanket
- Toy playground set: swing, people, slide, house
- Puppets
- Assorted soft toys
- Cars
- Assorted plastic food
- Magnetic blocks
- Velcro blocks
- Digger with pulling drawstring
- Fishing set
- Honeybee Tree by International Playthings
- Monkeying Around by International Playthings
- Crocodile Dentist by Winning Moves Games
- Pop-up Pirate by Tomy
- Balls
- Bubbles
- Bowling

**Appendix J**

**Checklist used for treatment fidelity**

| **Treatment Fidelity Checklist** | | |
|---|---|---|
| **Session Activity** | **Yes/No (√ or X)** | **Comments** |
| **(1) Probe task**<br>***(approximately 5-10 minutes, start of session)*** | | |
| Completed | | |
| Pictures of the target words and control words were presented randomly, as part of a play activity. | | |
| The participant was asked to describe each picture they saw e.g. "Tell me what you see". | | |
| Non-specific feedback was provided. | | |
| **(2) Structured teaching**<br>***(approximately 5 minutes, following probe task)*** | | |
| Completed | | |
| Pictures of the target words were shown to the participant. | | |
| The participant was asked to describe the picture e.g. "What's happening?" | | |
| Reinforcing feedback containing the target word was provided e.g. "That's right, the girl is reading". | | |
| **(3) Structured teaching in storybook reading**<br>***(approximately 10 minutes, following structured teaching)*** | | |
| Completed | | |
| Therapist encouraged child engagement with the book by:<br>- Using interactive books when possible e.g. 'lift-the-flaps')<br>- Being face-to-face with the child.<br>- Allowing the child to hold the book.<br>- Making comments and asking the child questions throughout the story to ensure an interactive experience. | | |
| Therapist highlighted the target words e.g.:<br>- Using stress to make the word louder, longer and using dynamic pitch/intonation changes.<br>- Using lots of repetition. | | |
| Therapist used sentence recasts to model the target word in well-formed phases and sentences. | | |
| Therapist further emphasised and explained the target | | |

| | | |
|---|---|---|
| words by:<br>- Pointing at illustrations<br>- Using gestures<br>- Using animated facial expressions | | |
| Therapist provided opportunities for elicited imitation, however the child was not required to produce the target words. | | |
| **(4) Focused Stimulation Play**<br>***(approximately 25 minutes, following storybook reading)*** | | |
| Completed | | |
| Therapist provided frequent and highly concentrated models of the target words:<br>- The adult produced the target word a minimum of 5 times, in short syntactically correct phrases or sentences. | | |
| Therapist manipulated the social, physical and linguistic environment to create opportunities for the target words to be modelled e.g. :<br>- Therapist chose toys that allowed for opportunities to use the target words.<br>- Therapist withheld toys or turns.<br>- Therapist manipulated/interfered with toy or play function.<br>- Therapist made intentional errors relating to target words.<br>- Therapist interfered with routine events/familiar play sequences. | | |
| Therapist highlighted the target words e.g.:<br>- Using stress to make the word louder, longer and using dynamic pitch/intonation changes.<br>- Using lots of repetition. | | |
| Therapist used sentence recasts to model the target word in well-formed phases and sentences. | | |
| Therapist further emphasised and illustrated the target words through:<br>- Demonstration with the toys.<br>- Use of gestures.<br>- Play-acting. | | |
| Therapist provided opportunities for elicited imitation, however the child was not required to produce the target words. | | |

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